

Control devices HM, HS and EO
Variable displacement pumps A4VSO, A4VSH and A4VSG
Series 1, 2 and 3

Size 40...1000 Nominal pressure 350 bar Peak pressure 400 bar

replaces 05.93

High pressure range

Ordering code

A4VS			/		-								
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Series	Rotation	Seals	Shaft end	Mounting flange	Service lines	Through drive	Valves	Filtration
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For detailed information see:
RE 92050 - A4VSO
RE 92110 - A4VSH
RE 92100 - A4VSG

Axial piston pump

Swashplate design, adjustable, industrial range **A4VS**

Type of operation

Pump, open circuit (sizes 40 - 1000)	O
Pump, semi-closed circuit (sizes 40, 71, 125 and 250)	H
Pump, closed circuit (sizes 40 - 1000)	G

Size

Displacement $V_{g\ max}$ [cm ³]	40	71	125	180	250	355	500	750	1000
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Control device

Hydraulic control, flow-dependent	HM	1				•	•	•	-	•	-	-	-	HM1	
	HM	2				•	•	•	•	•	•	•	•	◯	HM2
	HM	3				•	•	•	•	•	•	•	•	◯	HM3
			Set pressure range 20 - 100 bar				Set pressure range 200(250) - 350 bar								
							Set pressure range 50(100;125) - 350 bar								
Hydraulic control, with servo valve with SR7	HS					•	•	•	•	•	•	•	•	•	HS
	HS		E			•	•	•	•	•	•	•	•	•	HS E
	HS			K		•	•	•	•	•	•	•	•	◯	HS K
	HS	1				•	•	•	•	•	•	•	•	•	HS1
	HS	1	E			•	•	•	•	•	•	•	•	•	HS1 E
	HS	1		K		•	•	•	•	•	•	•	•	◯	HS1 K
Hydraulic control, with proportional valve For electronic flow control with VT 12350	HS	3				•	•	•	•	•	•	•	•	•	HS3
	HS	3	E			•	•	•	•	•	•	•	•	•	HS3 E
	HS	3		K		•	•	•	•	•	•	•	•	•	HS3 K
	HS	3			P	•	•	•	•	•	•	•	•	◯	HS3 P
	HS	3		K	P	•	•	•	•	•	•	•	•	◯	HS3 KP
	HS	3			U	•	•	•	•	•	•	•	•	◯	HS3 U
			without spring centring				with pressure transducer HM 14								
			without valves				with pressure transducer HM 15								
							with short circuit valve								
Hydraulic control, with proportional valve for electronic flow control with VT 5035 Max. pressure setting 100 bar, for size 500 125 bar Maximum pressure setting 350 bar	EO	1				•	•	•	-	•	-	-	-	EO1	
	EO	1	E			•	•	•	-	•	-	-	-	EO1 E	
	EO	1		K		•	•	•	-	•	-	-	-	EO1 K	
	EO	2				•	•	•	•	•	•	◯	◯	EO2	
	EO	2	E			•	•	•	•	•	•	•	•	•	EO2 E
	EO	2		K		•	•	•	•	•	•	◯	◯	EO2 K	
							with short circuit valve								
							without valves								

Filtration (Specify only A4VSG or A4VSO HS and HS1)

Without filter	•	•	•	•	•	•	-	-	-	-	-	-	N
Sandwich plate filter for HS and HS1 control systems	•	•	•	•	•	•	-	-	-	-	-	-	Z
A4VSG only: Filter mounted in feed circuit and sandwich filter for HS- and HS1 control	•	•	•	•	•	•	-	-	-	-	-	-	U

• = available ◯ = in preparation - = not available

HM1 / HM2 / HM3

Hydraulic control, flow-dependent

The volumetric flow (displacement) is set as a function of the amount of control fluid by means of the HM control device.

This control is used for 2-point control systems or as a base device for control systems with proportional valves (additional electrical feedback signal required).

The mechanical swivel angle limit can be set on both sides of the control within the range $V_{g \max}$ to $50\% V_{g \max}$.

Direction of flow S to B

Rotation	Pilot pressure	Swivel range*
cw	in X_1	a/cw
a/cw	in X_2	cw

Direction of flow

semi-closed circuit A(S_A) to B

Rotation	Pilot pressure	Swivel range*
cw	in X_1	a/cw
a/cw	in X_2	cw

Direction of flow

semi-closed circuit B(S_B) to A

Rotation	Pilot pressure	Swivel range*
cw	in X_2	cw
a/cw	in X_1	a/cw

Direction of flow

closed circuit A to B

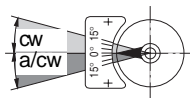
Rotation	Pilot pressure	Swivel range*
cw	in X_1	a/cw
a/cw	in X_2	cw

Direction of flow

closed circuit B to A

Rotation	Pilot pressure	Swivel range*
cw	in X_2	cw
a/cw	in X_1	a/cw

* cf: swivel angle indicator



HM 1

Control pressure $p_{\min} = 20 \text{ bar}$

$p_{\max} = 100 \text{ bar}$

Spring centring of the control cylinder is standard. It is used for **setting and adjusting in the unpressurized zero position**, but without defined reset in high pressure operation.

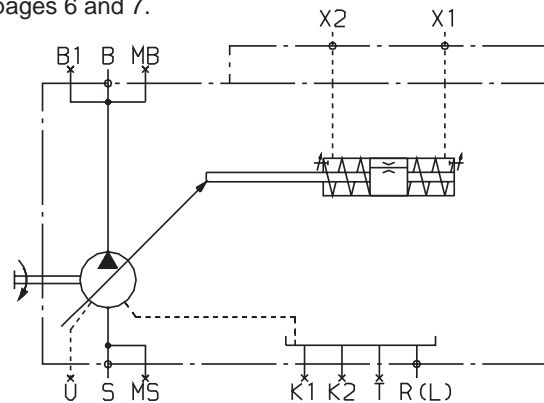
Technical data

Size		40	71	125	250
Control movement s_{\max}	mm	14.2	17.1	20.7	25.9
Control area A	cm ²	16.6	24.6	36.3	56.7
Control volume $V_{S \max}$	cm ³	23.6	42.1	75.2	147
Min. control pressure (in X_1, X_2) p_{\min}	bar	20	20	20	20
Max. permissible Control pressure p_{\max}	bar	100	100	100	100
Control time t_{\min}^*	s	0.12	0.20	0.22	0.40
Approx. weight (pump with control device)	kg	41	57	92	191

* dependent on amount of pilot oil and level of pilot pressure

Circuit diagram

Detailed circuit diagrams
see pages 6 and 7.



Please note: On the A4VSO pump for open circuit applications (swivel to one side only) the $V_{g \min}$ stop is set so that, when port B is plugged, a pressure of approx. 20 bar is set.

HM 2

Control pressure p_{\min} = 50 bar (sizes 40-125),
100 bar (sizes 180-355),
125 bar (sizes 500-750)

p_{\max} = 350 bar

Spring centring of the control cylinder is standard for all sizes. It is used for **setting and adjusting in the unpressurized zero position**, but without defined reset in high pressure operation.

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 125 - 750.

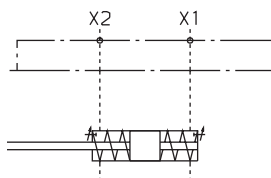
Technical data

Size	40	71	125	180	250	355	500	750
Control movement s_{\max}	mm 14.2	17.0	20.7	20.7	25.9	25.9	32.6	37.0
Control area A	cm ² 8.1	12.6	18.1	18.1	28.3	28.3	38.2	56.8
Control volume $V_{S \max}$	cm ³ 11.4	21.5	37.5	37.5	73.2	73.2	124.5	210
Min. control pressure (in X_1, X_2) p_{\min}	bar 50	50	50	100	100	100	125	125
Max. permissible control pressure p_{\max}	bar 350	350	350	350	350	350	350	350
Control time t_{\min}^*	s 0.04	0.06	0.09	0.09	0.12	0.12	0.15	0.2
Approx. weight (pump with control device)	kg 41	57	92	106	191	214	320	460

* dependent on amount of pilot oil and level of pilot pressure

Circuit diagram

Detailed circuit diagrams see pages 6 and 7.



HM 3

Control pressure p_{\min} = 200 bar (sizes 40-125),
250 bar (sizes 180-750)

p_{\max} = 350 bar

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 500 - 750.

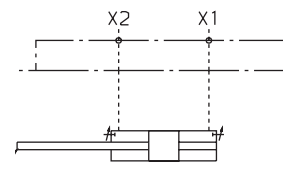
Technical data

Size	40	71	125	180	250	355	500	750
Control movement s_{\max}	mm 14.2	17.0	20.7	20.7	25.9	25.9	32.6	37.0
Control area A	cm ² 4.2	6.2	9.1	9.1	13.9	13.9	19.6	28.3
Control volume $V_{S \max}$	cm ³ 5.9	10.5	18.8	18.8	35.9	35.9	63.8	105
Min. control pressure (in X_1, X_2) p_{\min}	bar 200	200	200	250	250	250	250	250
Max. permissible control pressure p_{\max}	bar 350	350	350	350	350	350	350	350
Control time t_{\min}^*	s 0.04	0.06	0.09	0.09	0.12	0.12	0.15	0.2
Approx. weight (pump with control device)	kg 41	57	92	106	191	214	320	460

* dependent on amount of pilot oil and level of pilot pressure

Circuit diagram

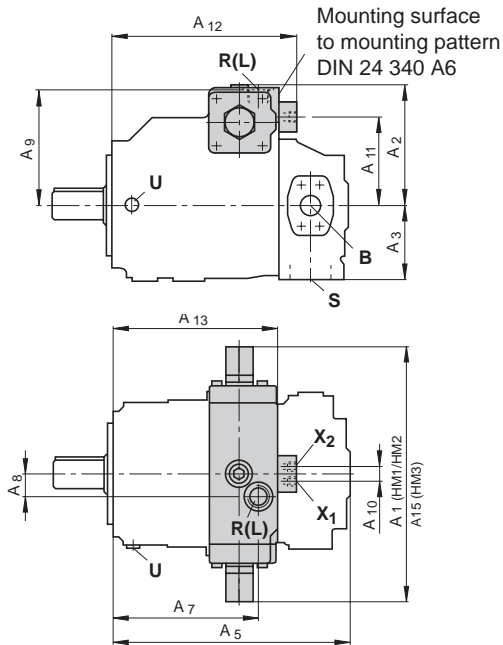
Detailed circuit diagrams see pages 6 and 7.



Unit dimensions HM1/ HM2/ HM3, Series 1 and 2

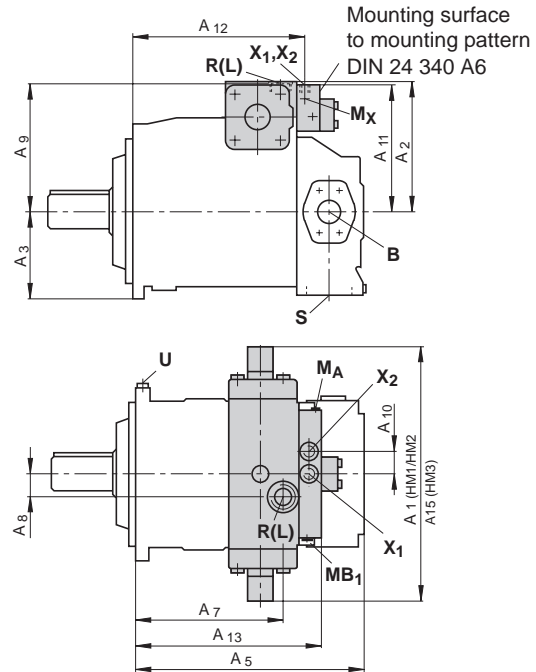
Size 40 - 355

A4VSO - open circuit - RE 92050



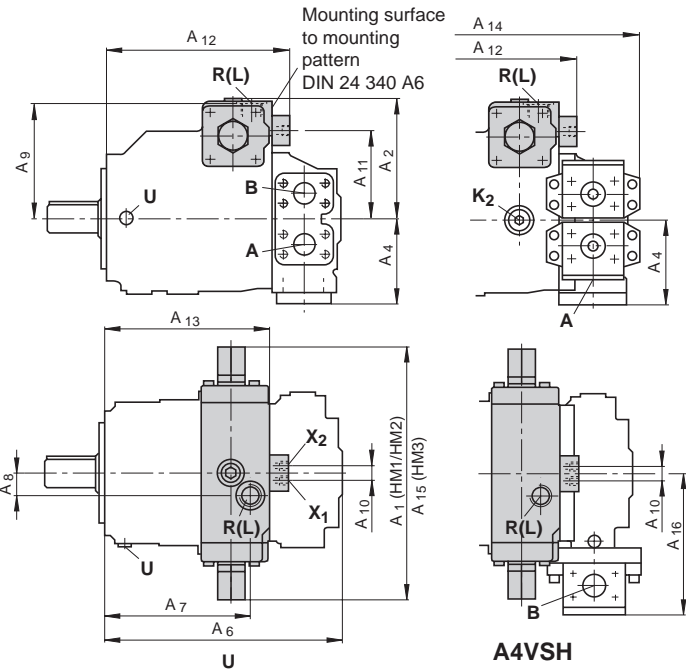
Size 500 - 750

A4VSO - open circuit - RE 92050

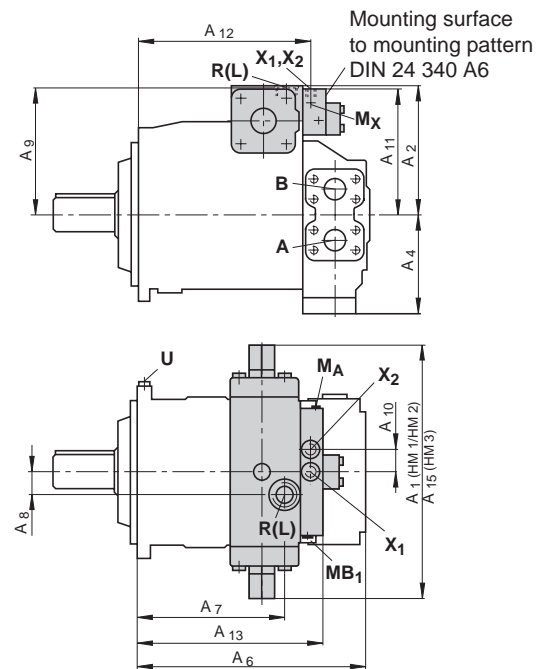


A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100



A4VSG - closed circuit - RE 92100



Unit dimensions

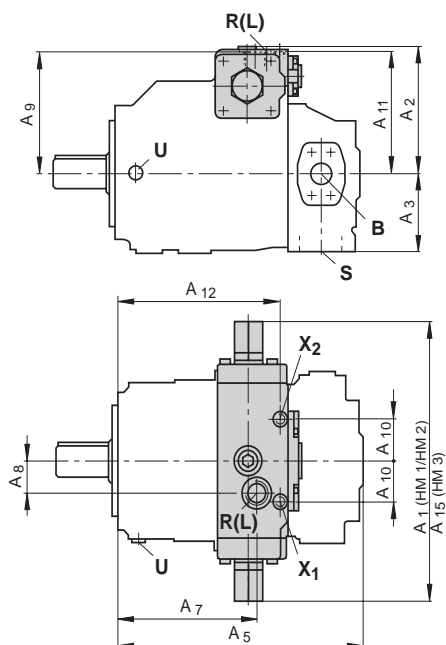
Size	Ports																	
	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	R(L)	X ₁ ; X ₂
40	296	135	91	110	269	281	169	30	135	24	102	217	189	285	260	215	M22x1.5	M14x1.5
71	330	153	106	113	298	306	193	34	152	24	111.5	244	216	322	296	230	M27x2	M14x1.5
125	401	188	122	133	355	363	233	36	186	24	132	293	265	388	354	235	M33x2	M14x1.5
180 ¹⁾	401	190	121	133	379	363	233	36	186	24	140	293	265	-	354	-	M33x2	M14x1.5
250	485	235	151	189	439	441	288	40	233	24	168	355	327	471	424	300	M42x2	M14x1.5
355 ¹⁾	485	235	151	191	468	468	288	40	233	24	168	355	327	-	424	-	M42x2	M14x1.5
500 ¹⁾	555	283	190	252	520	505	329	50	280	50	274	388	415	-	510	-	M48x2	M27x2
750 ¹⁾	611	320	232	280	564	591	351	50	318	50	304	420	397	-	582	-	M48x2	M27x2

¹⁾ HM 2 and HM 3 only

Unit dimensions HM1/ HM2/ HM3, Series 3

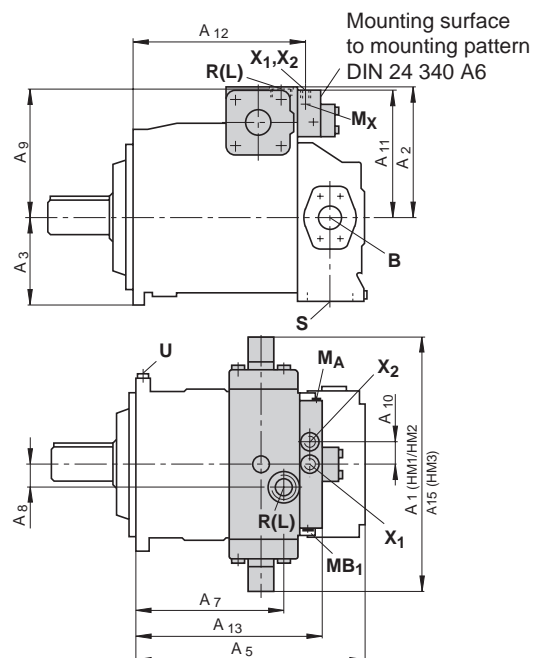
Size 125 - 355

A4VSO - open circuit - RE 92050



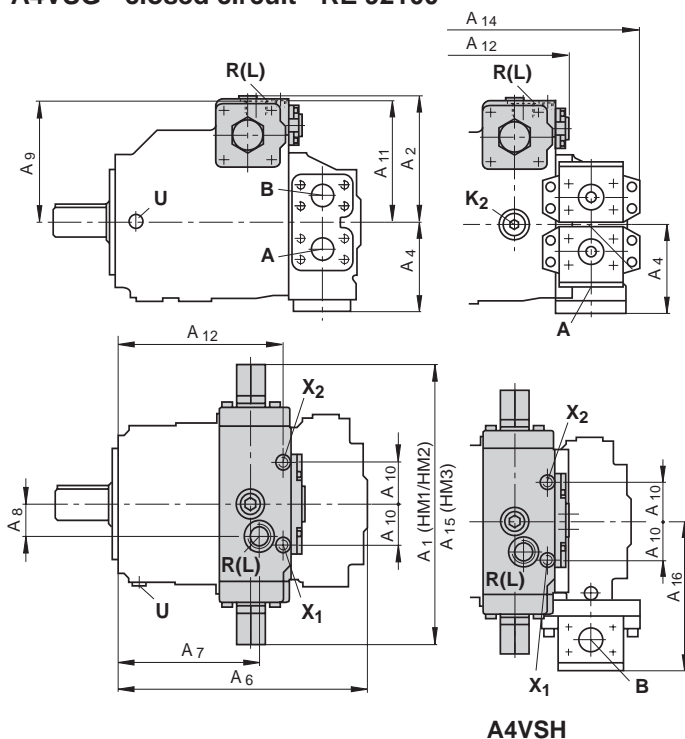
Size 500 - 750

A4VSO - open circuit - RE 92050

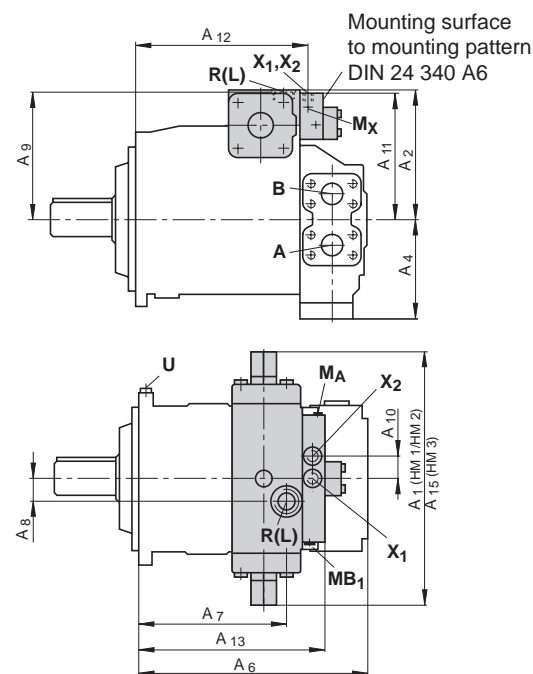


A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100



A4VSG - closed circuit - RE 92100



Unit dimensions (*Dimensions in italics are different to series 2*)

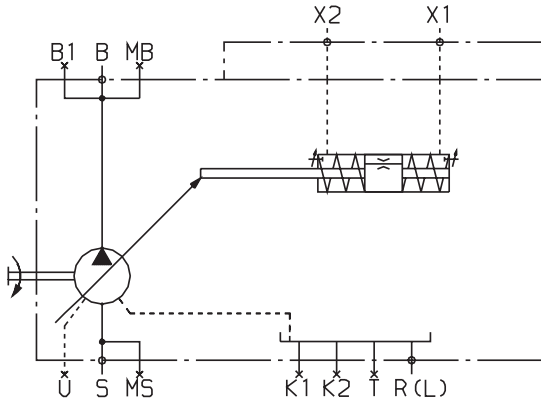
Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	R(L)	X ₁ ; X ₂
125	401	188	122	133	355	363	217	50	186	67	186	251	-	388	354	235	M33x2	M14x1.5
180 ¹⁾	401	190	121	133	379	363	217	50	186	67	186	251	-	-	354	-	M33x2	M14x1.5
250	485	235	151	189	439	441	265	55	233	71	233	311	-	471	424	300	M42x2	M18x1.5
355 ¹⁾	485	235	151	191	468	468	265	55	233	71	233	311	-	-	424	-	M42x2	M18x1.5
500 ¹⁾	555	283	190	252	520	505	329	50	280	50	274	388	415	-	510	-	M48x2	M27x2
750 ¹⁾	611	320	232	280	564	591	351	50	318	50	304	420	397	-	582	-	M48x2	M27x2

¹⁾ HM 2 and HM 3 only

Series 1 and 2

HM 1

Circuit diagram



Ports

- A,B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged) A4VSO
- R (L) Oil filling port and bleed (case drain port)
- U Flushing port (plugged)
- T Oil drain (plugged)
- X₁, X₂ Pilot pressure port
- S_A, S_B Anti-cavitation valve port (A4VSH)
- E Feed (A4VSG)
- R₂ - R₇ Bleed control (plugged) for sealed control chambers (for HM2 Sizes 125-750; for HM3 Sizes 500/750)
- M_A, M_{B1}, M_x Control pressure test port plugged (Sizes 500 and 750)

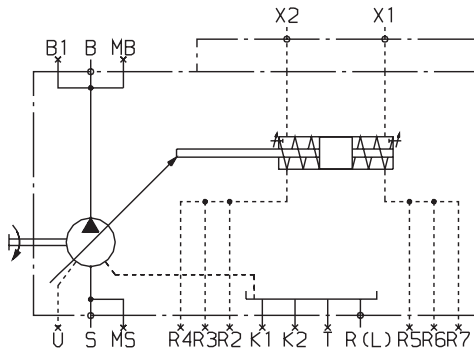
Unit dimensions, technical data and description see pages 2 to 5.

HM 2

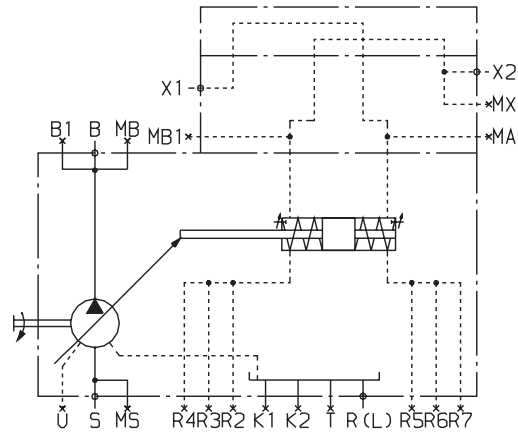
Circuit diagram

Sizes 40-355

Ports omitted on sizes 40 and 71 R₂-R₇



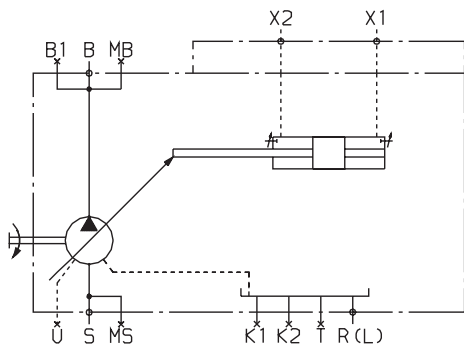
Sizes 500-750



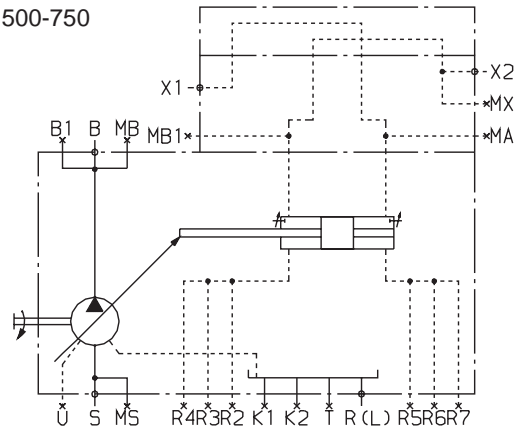
HM 3

Circuit diagram

Sizes 40-355



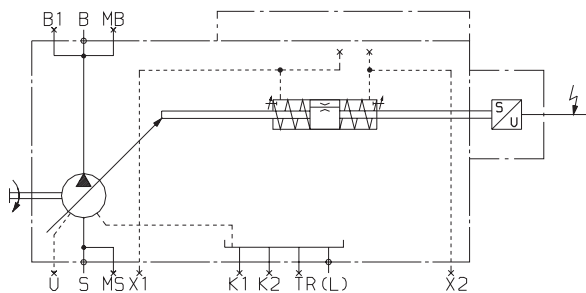
Sizes 500-750



Series 3

HM 1

Circuit diagram



Ports

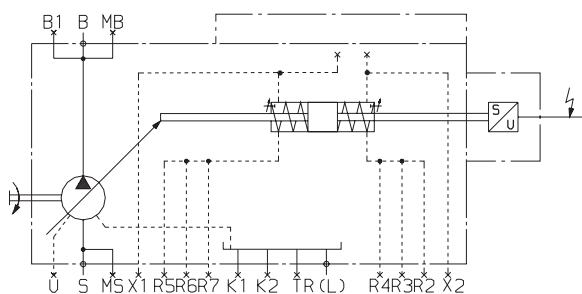
- A, B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged) A4VSO
- R (L) Oil filling port and bleed (case drain port)
- U Flushing port (plugged)
- T Oil drain (plugged)
- X₁, X₂ Pilot pressure port
- S_A, S_B Anti-cavitation valve port (A4VSH)
- E Feed (A4VSG)
- R₂ - R₇ Bleed control (plugged)
for sealed control chambers
(for HM2 Sizes 125-750; for HM3 Sizes 500/750)
- M_A, M_{B1}, M_X Control pressure test port plugged
(Sizes 500 and 750)

Unit dimensions, technical data and description
see pages 2 to 5.

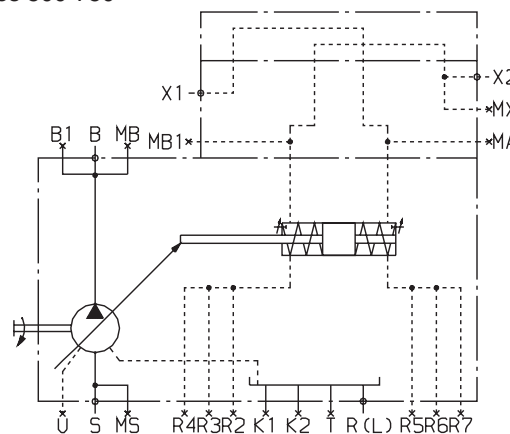
HM 2

Circuit diagram

Sizes 125-355



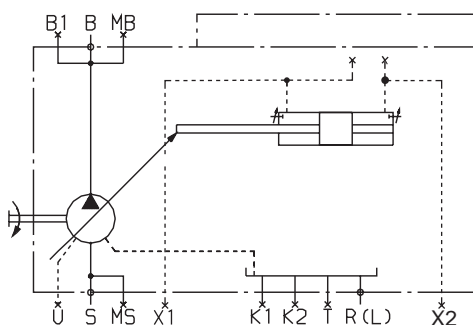
Sizes 500-750



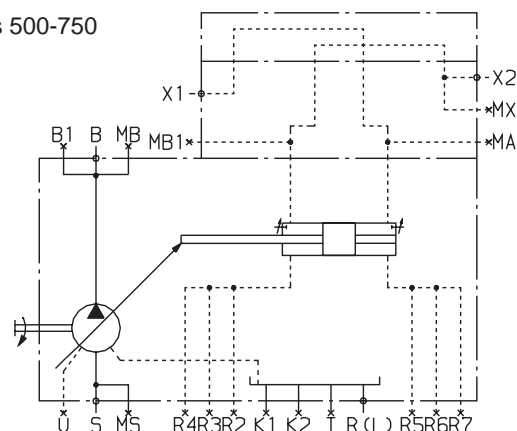
HM 3

Circuit diagram

Sizes 125-355



Sizes 500-750



HS/HS1

Hydraulic servo valve control

for electronic flow control using SR7

The HS control device is used to set the volumetric flow (displacement) as a function of the pilot oil flow via the built on servo valve.

The pump swivel position is fed back via a positional transducer.

In order to protect the servo valve the pump is supplied with an intermediate **flushing plate** (see circuit diagram).

After the flushing process the flushing plate is removed and the servo valve screwed directly on to the subplate (using screws supplied). Please observe the commissioning and RE 07700 and RE 29586.

The relevant electronics SR7 to RE 29993
card holder VT 3002 to RE 29928
and the power adapter VT 19084 to RE 29929
should be ordered separately.

Mechanical swivel angle limits for both sides $V_{g \max}$ up to 50 %
 $V_{g \max}$ are standard for all sizes.

Please note: On the A4VSO pump for open circuit applications (swivel to one side only) the $V_{g \min}$ stop is set so that, when port B is plugged, a pressure of approx. 20 bar is set.

For unit dimensions see pages 12-14.

Components

- 1 Pump with hydraulic control device
(see technical data)
 - 1.1 A4VSO
 - 1.2 A4VSH
 - 1.3 A4VSG
- 2 4/3-directional servo valve (see RE 29586)

Size	Type
40 and 71	4WS2EM10-4X/20B2ET315Z8DM
125 and 180	4WS2EM10-4X/30B2ET315Z8DM
250 and 355	4WS2EM10-4X/45B2ET315Z8DM
500 - 1000	4WS2EM10-4X/75B2ET315Z8DM
- 3 Actual value transmitter (inductive positional transducer)
Type IW9-03-01
 - 4.1 Anti-cavitation valves (A4VSH)
 - 4.2 Feed valves (A4VSG)
- 5 Sandwich plate
- 6 Flushing plate

Ports

- | | |
|-----------------------|---|
| A, B | Pressure port |
| B_1 | Auxiliary port (plugged) |
| S | Suction port (A4VSO) |
| K_1, K_2, K_3 | Flushing port (plugged) |
| M_A, M_B | Operating pressure test port (plugged) |
| M_S | Suction pressure test port (plugged) |
| R (L) | Oil filling port and bleed (case drain port) |
| T | Oil drain (plugged) |
| U | Flushing port (plugged) |
| P, S_p | Control pressure port |
| R_{KV} | Control oil return |
| S_A, S_B | Anti-cavitation valve port (A4VSH) |
| E | Feed (A4VSG) |
| $R_2 - R_7$ | Bleed control (plugged), sizes 125-750 |
| M_{A1}, M_{B1}, M_P | Control pressure test port (plugged), sizes 500-750 |
| M_1, M_2 | Control pressure test port (plugged), sizes 125-355 series 30 |

HS

Control pressure p_{\min} = 100 bar (sizes 40-125),
125 bar (sizes 180-355),
150 bar (sizes 500-1000)

p_{\max} = 315 bar

Spring centring of the control cylinder is standard for all sizes. It is used for **setting and adjusting in the unpressurized zero position**, but without defined reset in high pressure operation.

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 125 - 1000.

Technical data

Size	40	71	125	180	250	355	500	750	1000
Control movement s_{\max}	mm 14.2	17.1	20.7	20.7	25.9	25.9	32.6	37.0	41.4
Control area A	cm ² 8.1	12.6	18.1	18.1	28.3	28.3	38.2	56.8	63.6
Control volume $V_{S \max}$	cm ³ 11.4	21.5	37.5	37.5	73.2	73.2	124.5	210	263.3
Min. required control pressure p_{\min} in P	bar 100	100	100	125	125	125	150	150	150
Max. permissible control pressure p_{\max} in P ¹⁾	bar 315	315	315	315	315	315	315	315	315
Control time $t_{\min}^{2)}$ s	0.04	0.06	0.09	0.09	0.12	0.12	0.15	0.2	*

¹⁾ depending on permitted servo data

²⁾ at minimum control pressure

* on request

HS 1

Control pressure p_{\min} = 200 bar (sizes 40-125),
250 bar (sizes 180-1000)

p_{\max} = 315 bar

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 500 - 1000. Without spring centring.

Technical data

Size	40	71	125	180	250	355	500	750	1000
Control movement s_{\max}	mm 14.2	17.0	20.7	20.7	25.9	25.9	32.6	37.0	41.4
Control area A	cm ² 4.2	6.2	9.1	9.1	13.9	13.9	19.6	28.3	31.2
Control volume $V_{S \max}$	cm ³ 5.9	10.5	18.8	18.8	35.9	35.9	63.8	105	129.2
Min. required control pressure p_{\min} in P	bar 200	200	200	250	250	250	250	250	250
Max. permissible control pressure p_{\max} in P ¹⁾	bar 315	315	315	315	315	315	315	315	315
Control time $t_{\min}^{2)}$ s	0.04	0.06	0.09	0.09	0.12	0.12	0.15	0.2	*

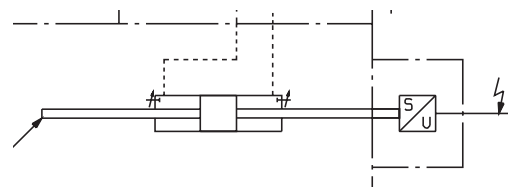
¹⁾ depending on permitted data for servo valve

²⁾ at minimum control pressure

* on request

Circuit diagram

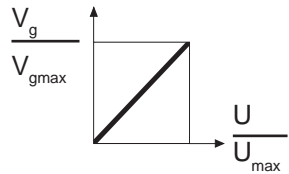
otherwise as HS



Series 1 and 2

A4VSO - open circuit RE 92050 - HS

Characteristic curve

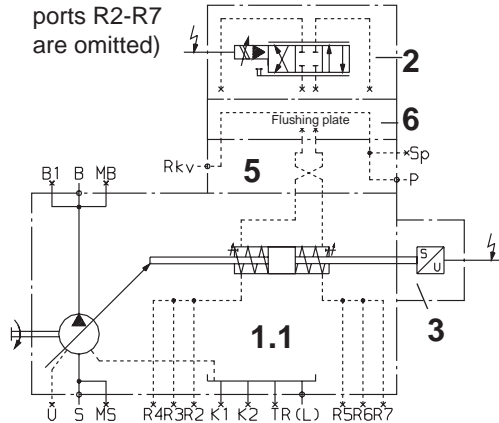


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

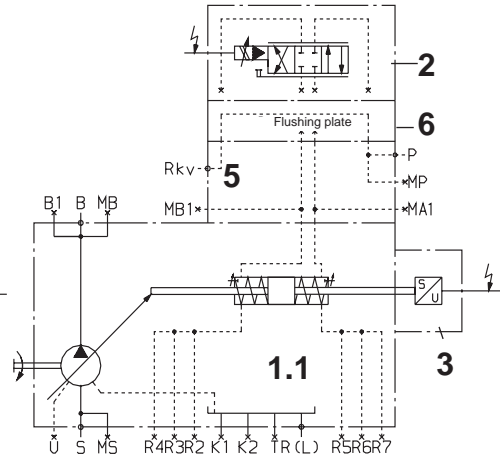
Circuit diagram

Sizes 40-355
 (on sizes 40 and 71
 ports R2-R7
 are omitted)



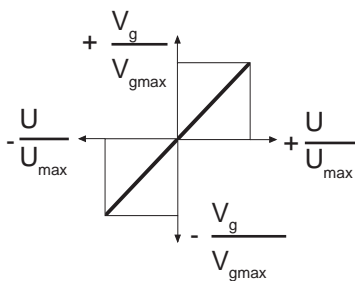
Circuit diagram

Sizes 500-750



A4VSH - semi-closed circuit RE 92110 - HS

Characteristic curve

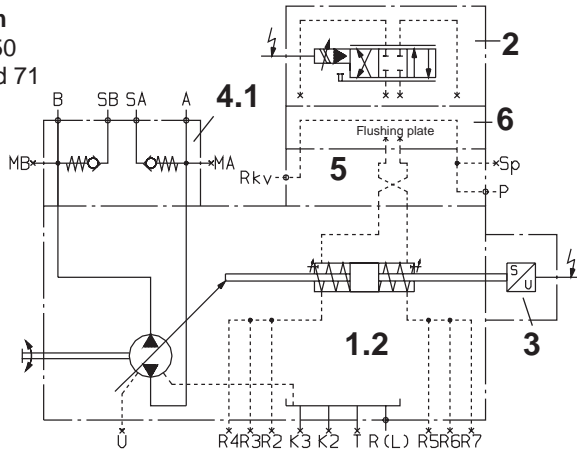


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

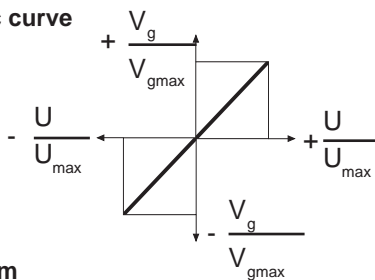
Circuit diagram

Sizes 40 and 250
 (on sizes 40 and 71
 ports R2-R7
 are omitted)



A4VSG - closed circuit RE 92100 - HS

Characteristic curve

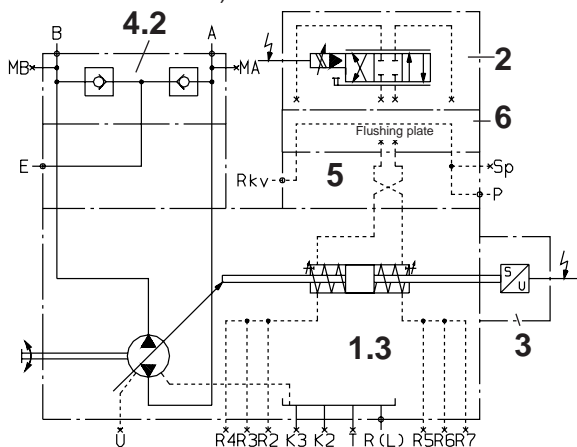


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

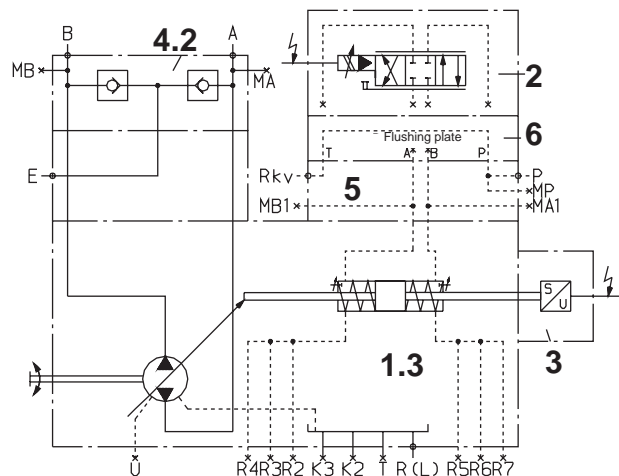
Circuit diagram

Sizes 40-355 (on sizes 40 and 71
 ports R2-R7 are omitted)



Circuit diagram

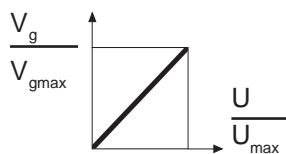
Sizes 500-1000



Series 3

A4VSO - open circuit RE 92050 - HS

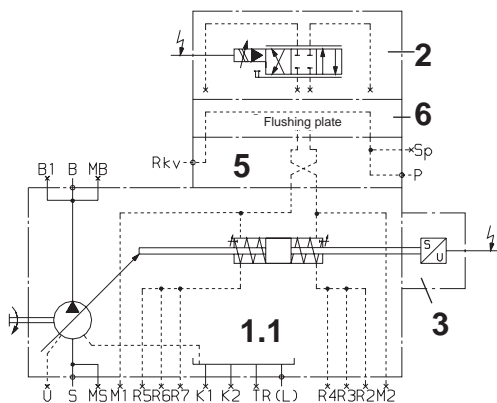
Characteristic curve



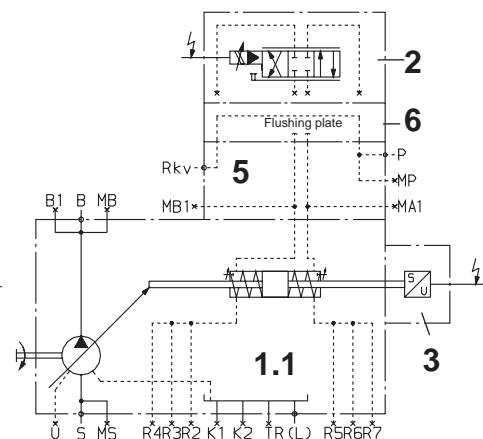
- Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
- Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
- Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram Sizes 125-355

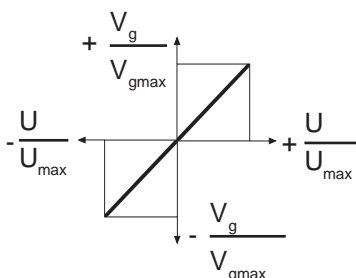


Circuit diagram Sizes 500-750



A4VSH - semi-closed circuit RE 92110 - HS

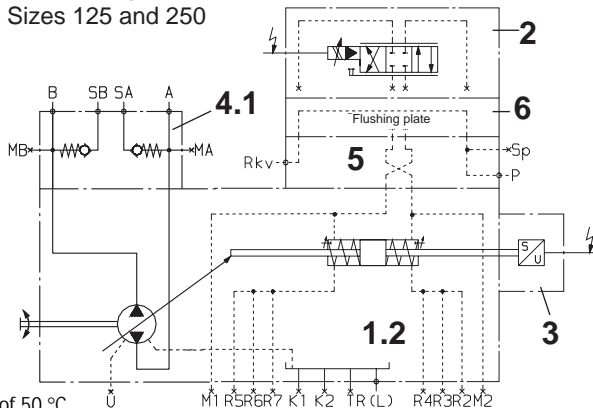
Characteristic curve



- Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
- Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
- Linearity deviation $\leq 2\%$ of $V_{g\max}$

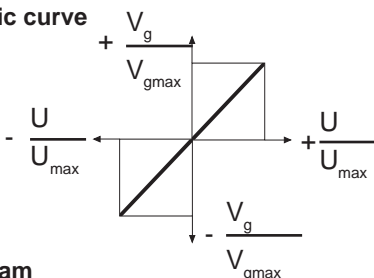
Values applicable for constant operating temperature of 50 °C.

Circuit diagram Sizes 125 and 250



A4VSG - closed circuit RE 92100 - HS

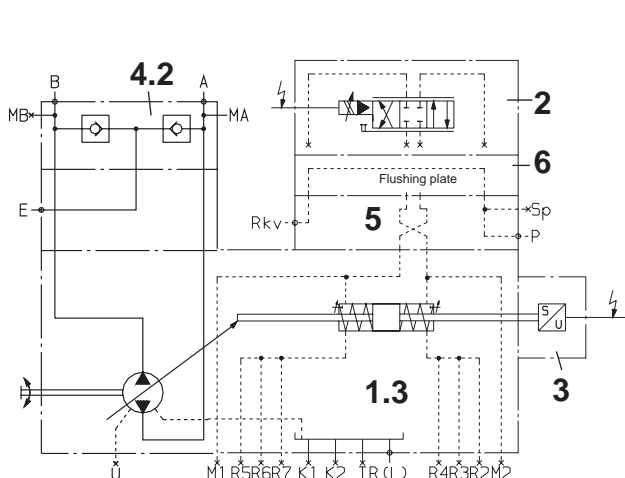
Characteristic curve



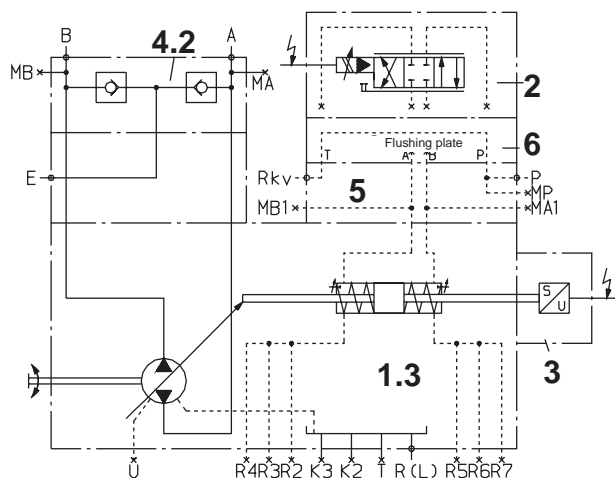
- Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
- Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
- Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram Sizes 125-355



Circuit diagram Sizes 500-1000



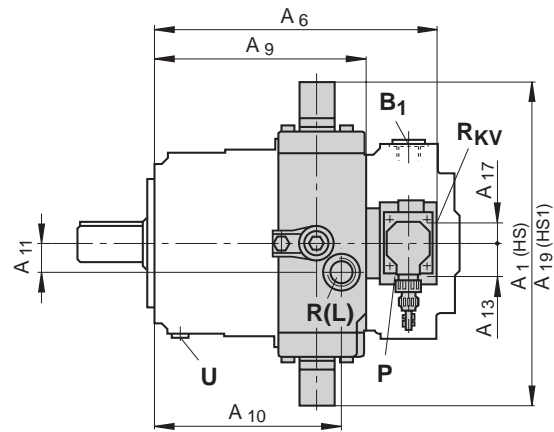
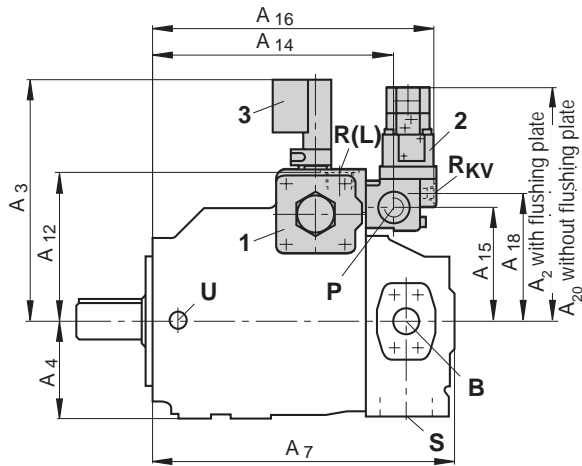
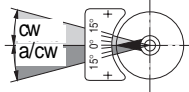
Unit dimensions HS / HS1, Sizes 40 - 355, Series 1 and 2

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

) cf: swivel angle indicator



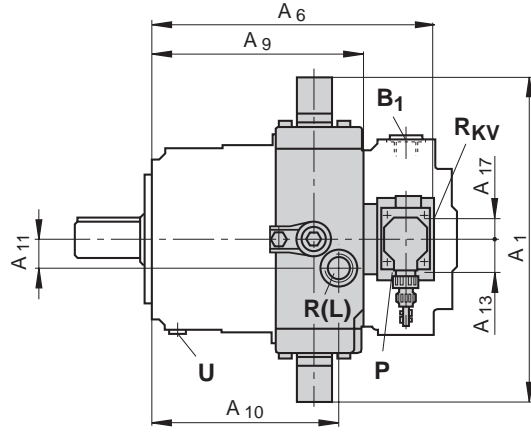
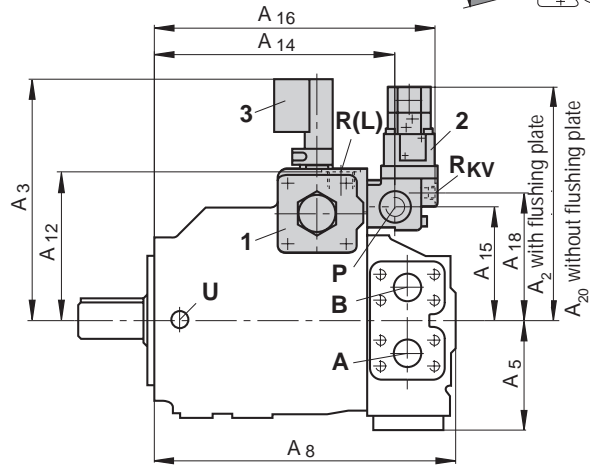
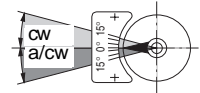
A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	Swivel range*
cw	a/cw
B(S_B) to A	A(S_A) to B
A(S_A) to B	B(S_B) to A

) cf: swivel angle indicator



Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	A ₁₇	A ₁₈	A ₁₉	A ₂₀
40	296	272	246	91	110	275	269	281	144	169	30	135	43	222	108	273	35	128	260	257
71	332	287	265	106	113	302	298	306	166	193	34	152	48	249	123	300	30	143	296	272
125	401	300	298	122	133	351	355	363	203	233	36	185,5	48	298	136	349	30	156	354	285
180	401	300	298	122	133	351	379	363	203	233	36	185,5	48	298	136	349	30	156	354	285
250	485	336	345	151	189	413	439	441	248	288	40	233	48	360	172	411	30	192	424	321
355	485	336	345	151	191	413	468	468	248	288	40	233	48	360	172	411	30	192	424	321

Ports

Size	P, S _p	R _{kv}	R(L)	R ₂₋₇
40	M22x1.5	M22x1.5	M22x1.5	-
71	M22x1.5	M22x1.5	M27x2	-
125	M22x1.5	M22x1.5	M33x2	M10x1
180	M22x1.5	M22x1.5	M33x2	M10x1
250	M22x1.5	M22x1.5	M42x2	M10x1
355	M22x1.5	M22x1.5	M42x2	M10x1

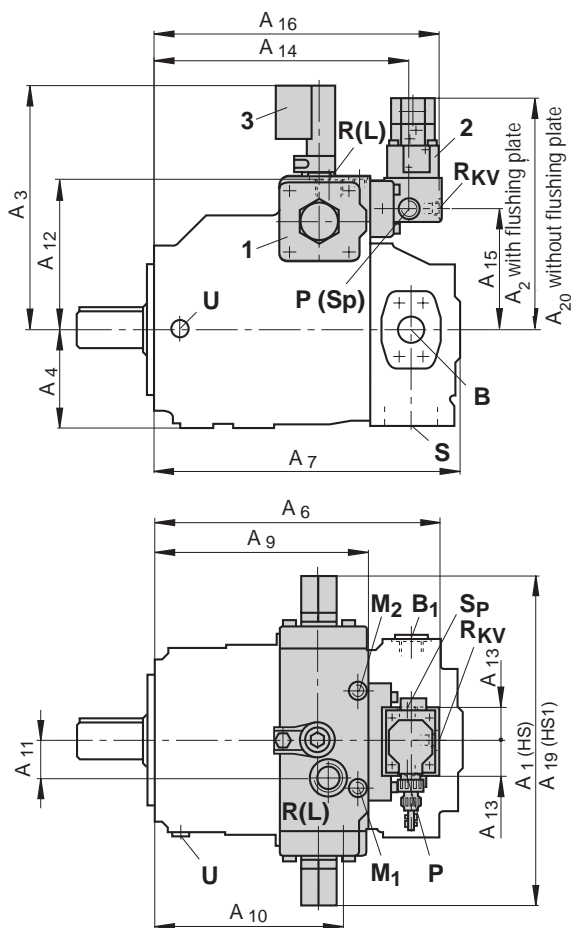
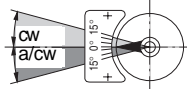
Unit dimensions HS / HS1, Sizes 125 - 355, Series 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

) cf: swivel angle indicator



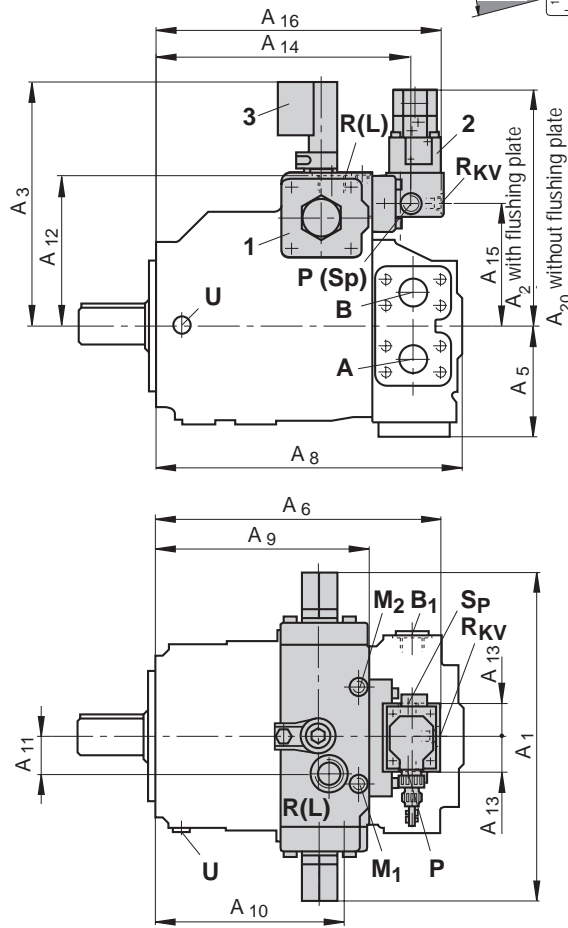
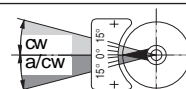
A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	Swivel range*
cw	a/cw
B(S_B) to A	A(S_A) to B
A(S_A) to B	B(S_B) to A

) cf: swivel angle indicator



Unit dimensions (Dimensions in italics are different to series 2)

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	A ₁₉	A ₂₀
125	401	304	298	122	133	366	355	363	203	217	50	185.5	39	309	148	350	354	289
180	401	304	298	122	133	351	379	363	203	217	50	185.5	39	309	148	350	354	289
250	485	340	345	151	189	436	439	441	248	265	55	233	39	371	184	412	424	325
355	485	340	345	151	191	436	468	468	248	265	55	233	39	371	184	412	424	325

Ports

Size	P, S _P	R _{KV}	R(L)	R ₂₋₇	M ₁ , M ₂
125	M22x1.5	M22x1.5	M33x2	M10x1	M14x1.5
180	M22x1.5	M22x1.5	M33x2	M10x1	M14x1.5
250	M22x1.5	M22x1.5	M42x2	M10x1	M18x1.5
355	M22x1.5	M22x1.5	M42x2	M10x1	M18x1.5

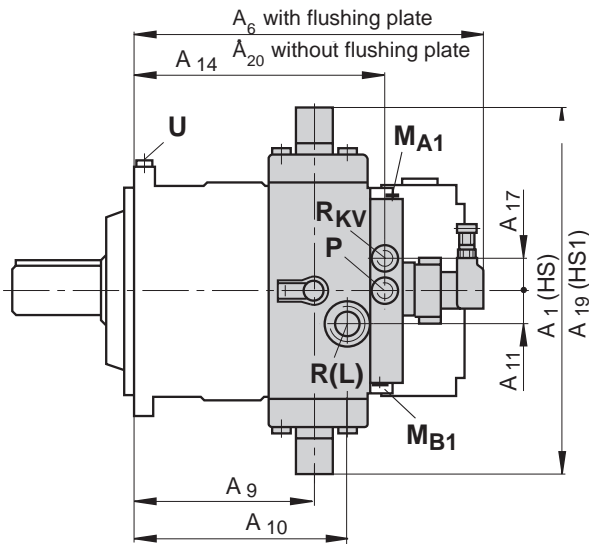
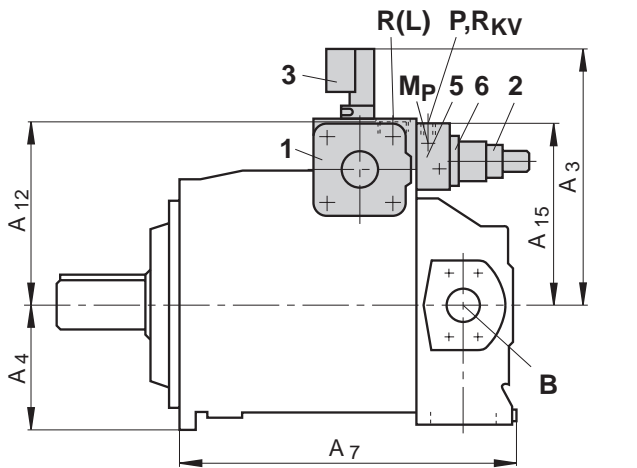
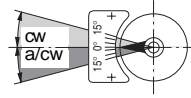
Unit dimensions HS / HS1, Sizes 500 - 1000, Series 2 and 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

*) cf: swivel angle indicator

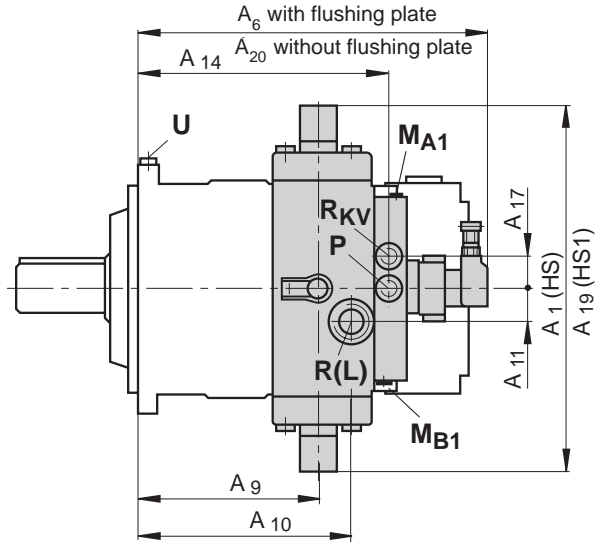
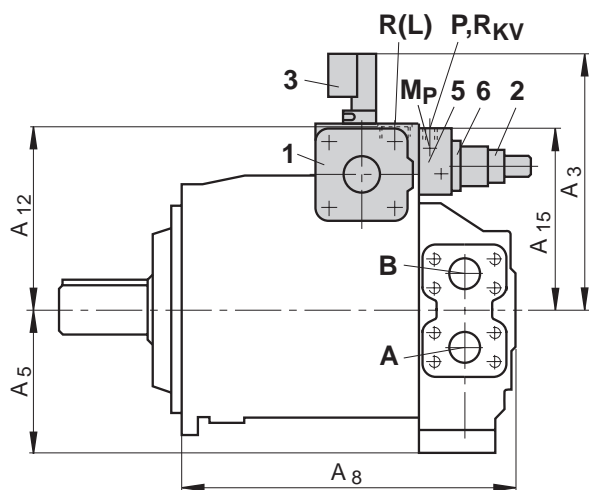
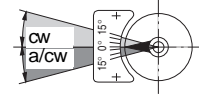


A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	a/cw	Swivel range*
B to A	A to B	cw
A to B	B to A	a/cw

*) cf: swivel angle indicator



Unit dimensions

Size	A ₁	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₄	A ₁₅	A ₁₇	A ₁₉	A ₂₀
500	555	392	190	225	533	520	505	279	329	50	280	388	274	50	510	518
750	611	428	232	280	565	564	591	301	351	50	318	420	304	50	582	550
1000	670	456	-	280	625	-	656	360	411	55	344	486	327	50	622	486

Ports

Size	R(L)	R _{kv}	P	M _{A1, B1, P}	R ₂₋₇
500	M48x2	M27x2	M27x2	M14x1.5	M14x1.5
750	M48x2	M27x2	M27x2	M14x1.5	M14x1.5
1000	M48x2	M27x2	M27x2	M14x1.5	M14x1.5

HS 3(P/U)

Hydraulic control with proportional valve

for electronic pressure and power control with VT 12350

Control pressure p_{\min} = 100 bar (sizes 40-125),
125 bar (sizes 180-355),
150 bar (sizes 500-1000)
 p_{\max} = 315 bar

The HS3 or HS3K control device is used in combination with the built-on direct-operated proportional valve to set the pump displacement as a function of pilot oil flow. Pump position feedback is provided by means of a position transducer.

Spring centring (for setting and adjusting in the unpressurized zero position, but without defined reset in high pressure operation) and mechanical swivel angle limiting to a maximum of 50% stroke ($50\% V_{g \max}$) in both directions are standard for all sizes.

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 125 - 1000.

The **HM14** or **HM15 pressure transducer** is used to detect the system pressure. If you wish this transducer to be fitted directly to the A4VS...HS3 and included in the delivery, please quote the following order references:

HS3P (Current output with HM15-1X/450) or

HS3U (Voltage output with HM14-1X/450)

Otherwise, please order the transducers separately.

The associated electronic control unit conforming to RE 30021, Ref. VT 12350-3X for driving the HS3 hydraulic control, **should be ordered separately**.

The digital control amplifier VT 1230 is programmed via the serial interface of the amplifier using control panel BB-3 (RE 29795-01-B) or with the BODIV PC program (RE 29899-B). For further information, please refer to RE 30021.

Technical data

Size	40	71	125	180	250	355	500	750	1000
Control movement s_{\max}	mm 14.2	17.1	20.7	20.7	25.9	25.9	32.5	37.0	41.4
Control area A	cm ² 8.1	12.6	19.0	19.0	28.3	28.3	38.2	56.8	63.6
Control volume $V_{S \max}$	cm ³ 11.4	21.5	37.5	37.5	73.2	73.2	124.5	210	263.3
Min. required control pressure bar	100	100	100	125	125	125	150	150	150
p_{\min} in P									
Max. permissible control pressure bar	315	315	315	315	315	315	315	315	315
p_{\max} in P									
Control time t_{\min}^2 s	0.04	0.06	0.09	0.09	0.12	0.12	0.15	0.2	*

The maximum permissible control pressure in P is limited by the permitted proportional valve data.

1) at minimum control pressure * on request

Note:

Open circuit

When the valve is de-energized and the control pressure is on, the pump swivels to Q_{\min} .

Closed and semi-closed circuit.

In the version without short-circuit valve, de-energized valve and applied control pressure, the pump swivels to Q_{\max} (swivel angle cw).

Please note: On the A4VSO pump for open circuit applications (swivel to one side only) the $V_{g \min}$ stop is set so that, when port B is plugged, a pressure of approx. 20 bar is set.

Components

- 1 Pump with hydraulic control device (see technical data)
 - 1.1 A4VSO
 - 1.3 A4VSG
- 2.1 4/3-way proportional valve (see RE 30021) for A4VSO-rotation cw, A4VSH and A4VSG

Size	Type
40 and 71	STW0070 - 1X/D16
125 and 180	STW0070 - 1X/D32
250 and 355	STW0070 - 1X/D40
500 - 1000	STW0048 - 1X/AV42G24Z9M

- 2.2 4/3-way proportional valve (see RE 30021) for A4VSO-rotation a/cw

Size	Type
40 and 71	STW0073 - 1X/D16
125 and 180	STW0073 - 1X/D32
250 and 355	STW0073 - 1X/D40
500 - 1000	STW0048 - 1X/BV42G24Z9M

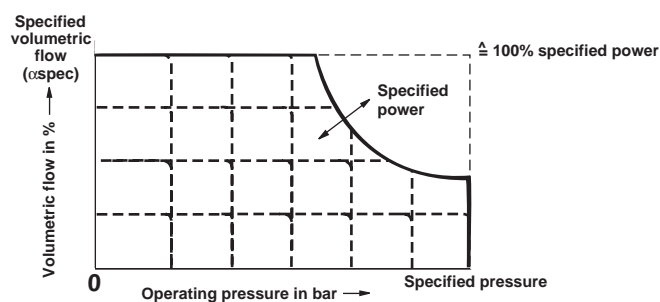
- 3 Actual value transmitter (inductive positional transducer) Type IW9-03-01
- 4 Anti-cavitation valves (A4VSH)
- 5 Feed valves
- 6 Pressure transducer HM15, for HS3P or pressure transducer HM14, for HS3U

For unit dimensions see pages 20 - 22.

Ports

- A, B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P, S_P Control pressureanschluß
- S_A, S_B Anti-cavitation valve port (A4VSG)
- E Feed (A4VSG)
- R₂ - R₇ Bleed control (sizes 125-750)
- R_{KV} Control oil return
- M_{A1}, M_{B1}, M_P Control pressure test port (plugged), sizes 500-1000
- M₁, M₂ Control pressure test port (plugged), sizes 125-355 series 30

Statische characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g \max}$

Min. repeatability $\leq \pm 0.5\%$ of $V_{g \max}$

Linearity deviation $\leq 2\%$ of $V_{g \max}$

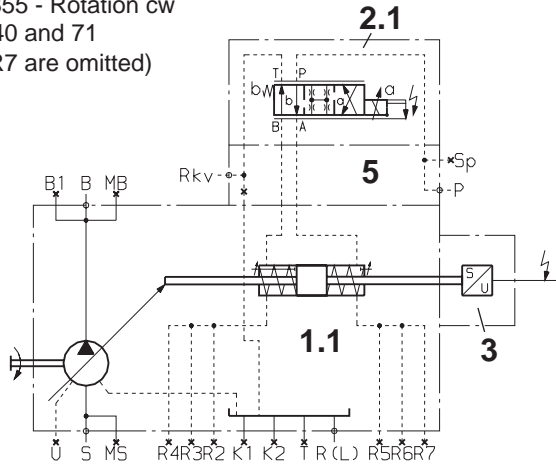
Values applicable for constant operating temperature of 50 °C.

HS3(P/U), Sizes 40 - 355, Series 1 and 2

A4VSO - open circuit RE 92050

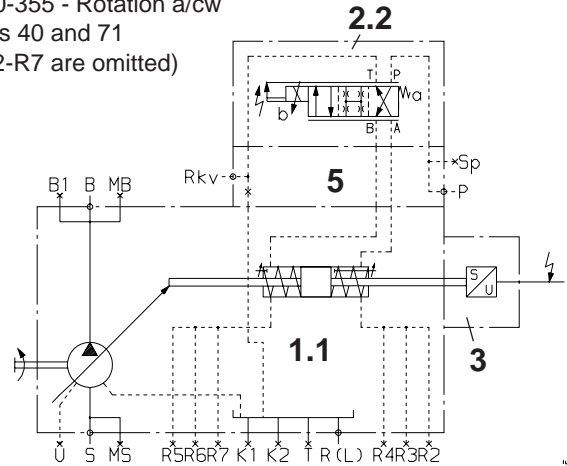
Circuit diagram HS3

Sizes 40-355 - Rotation cw
(on sizes 40 and 71
ports R2-R7 are omitted)



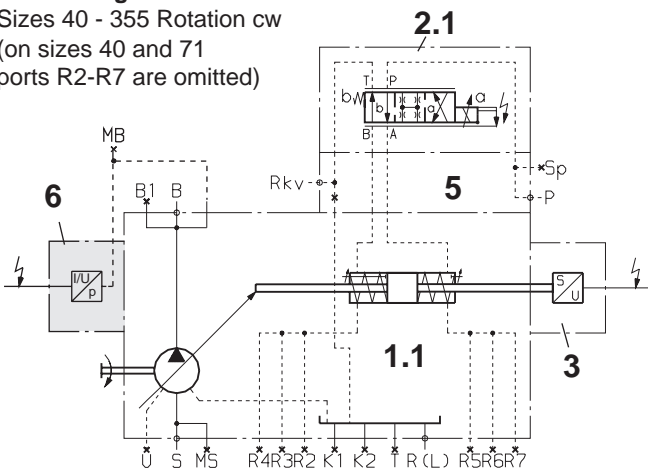
Circuit diagram HS3

Sizes 40-355 - Rotation a/cw
(on sizes 40 and 71
ports R2-R7 are omitted)



Circuit diagram HS3P/U

Sizes 40 - 355 Rotation cw
(on sizes 40 and 71
ports R2-R7 are omitted)



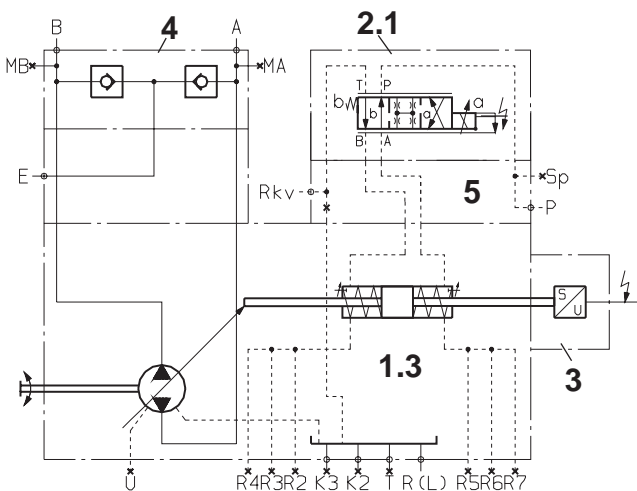
Ports

- A,B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P, S_p Control pressureanschluß
- E Feed (A4VSG)
- R₂ - R₇ Adjust feed (sizes 125-750)
- R_{kv} Control oil return

A4VSG - closed circuit RE 92100

Circuit diagram HS3

Sizes 40-355
(on sizes 40 and 71 ports R2-R7 are omitted)



Components

- 1 Pump with hydraulic control device (see technical data)
- 1.1 A4VSO
- 1.3 A4VSG
- 2.1 4/3-way proportional valve (see RE 30021)
for A4VSO-Rotation cw, A4VSH and A4VSG

Size	Type
40 and 71	STW0070 - 1X/D16
125 and 180	STW0070 - 1X/D32
250 and 355	STW0070 - 1X/D40
500 -1000	STW0048 - 1X/AV42G24Z9M
- 2.2 4/3-way proportional valve (see RE 30021)
for A4VSO-Rotation a/cw

Size	Type
40 and 71	STW0073 - 1X/D16
125 and 180	STW0073 - 1X/D32
250 and 355	STW0073 - 1X/D40
500 -1000	STW0048 - 1X/BV42G24Z9M
- 3 Actual value transmitter (inductive positional transducer)
Type IW9-03-01
- 4 Anti-cavitation valves (A4VSG)
- 5 Feed valves
- 6 Pressure transducer HM15, for HS3P or
Pressure transducer HM14, for HS3U

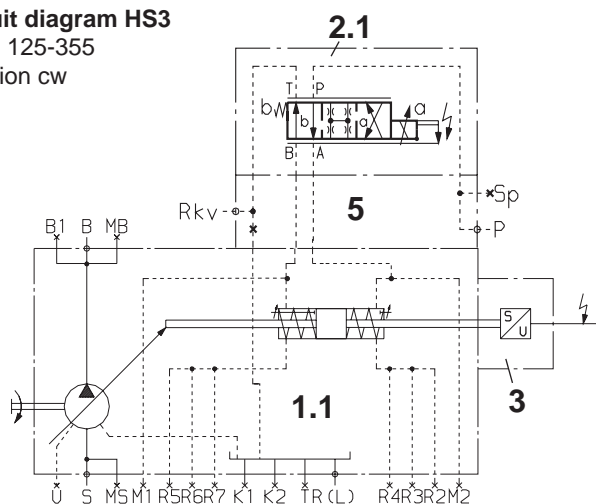
HS3(P/U), Sizes 125 - 355, Series 3

A4VSO - open circuit RE 92050

Circuit diagram HS3

Sizes 125-355

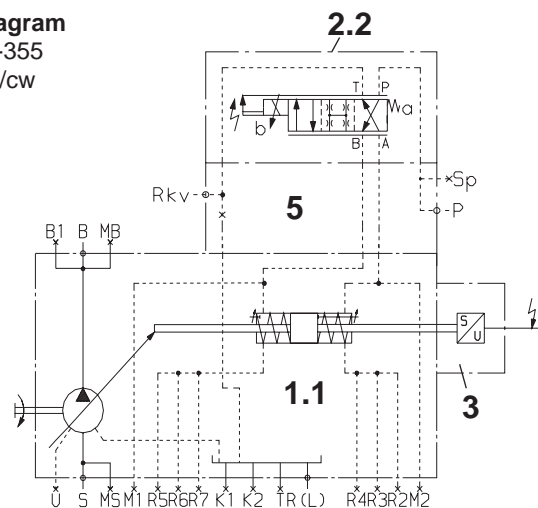
Rotation cw



Circuit diagram

Sizes 125-355

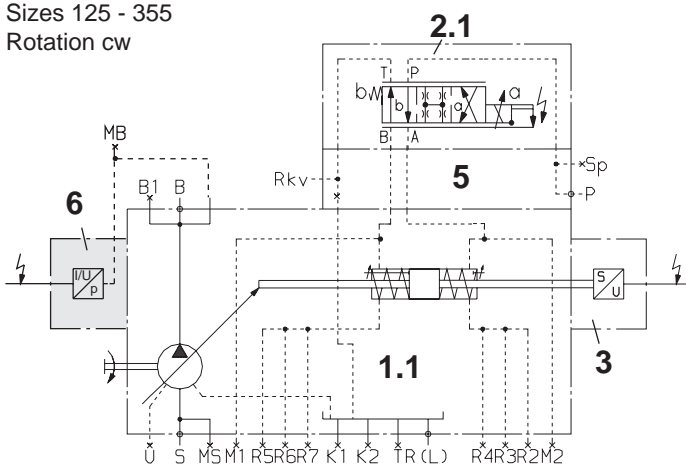
Rotation a/cw



Circuit diagram HS3P/U

Sizes 125 - 355

Rotation cw



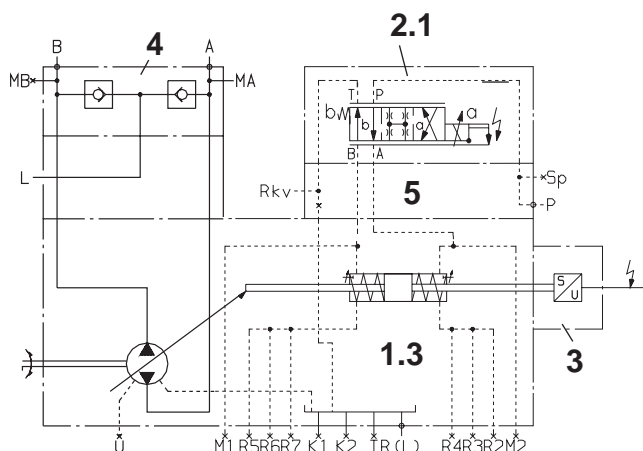
Ports

- A,B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P, S_P Control pressureanschluß
- E Feed (A4VSG)
- R₂ - R₇ Adjust feed (sizes 125-750)
- R_{kv} Control oil return
- M₁, M₂ Control pressure test port (plugged), sizes 125-355 series 30

A4VSG - closed circuit RE 92100

Circuit diagram HS3

Sizes 125-355



Components

- 1 Pump with hydraulic control device (see technical data)
- 1.1 A4VSO
- 1.3 A4VSG
- 2.1 4/3-way proportional valve (see RE 30021) for A4VSO-Rotation cw, A4VSH and A4VSG

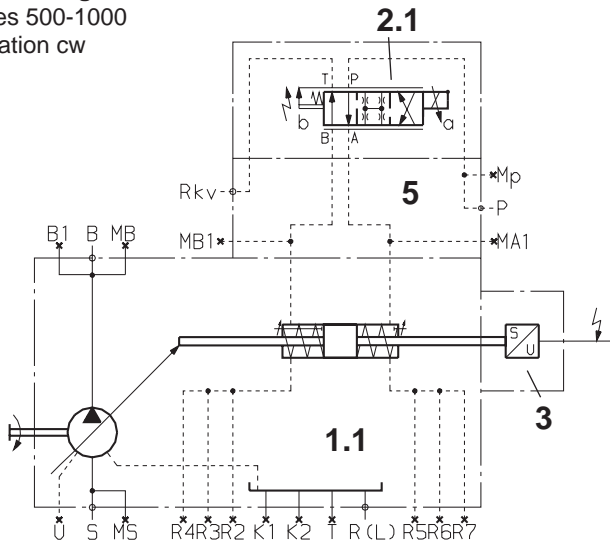
Size	Type
40 and 71	STW0070 - 1X/D16
125 and 180	STW0070 - 1X/D32
250 and 355	STW0070 - 1X/D40
500 -1000	STW0048 - 1X/AV42G24Z9M
- 2.2 4/3-way proportional valve (see RE 30021) for A4VSO-Rotation a/cw

Size	Type
40 and 71	STW0073 - 1X/D16
125 and 180	STW0073 - 1X/D32
250 and 355	STW0073 - 1X/D40
500 -1000	STW0048 - 1X/BV42G24Z9M
- 3 Actual value transmitter (inductive positional transducer) Type IW9-03-01
- 4 Anti-cavitation valves (A4VSG)
- 5 Feed valves
- 6 Pressure transducer HM15, for HS3P or Pressure transducer HM14, for HS3U

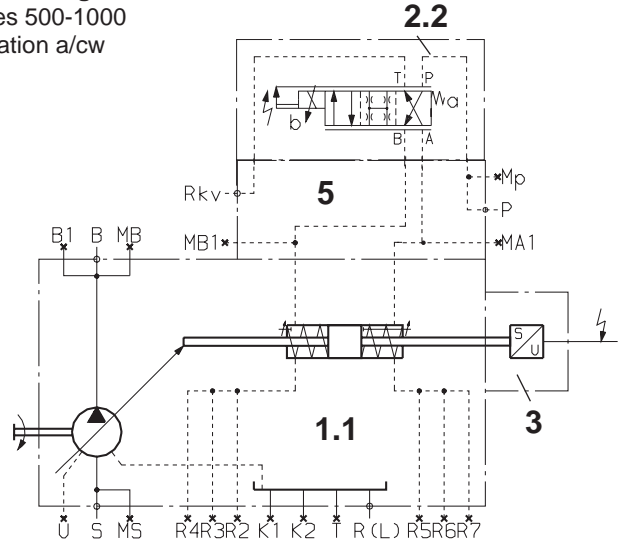
HS3(P/U), Sizes 500 - 1000, Series 2 and 3

A4VSO - open circuit RE 92050

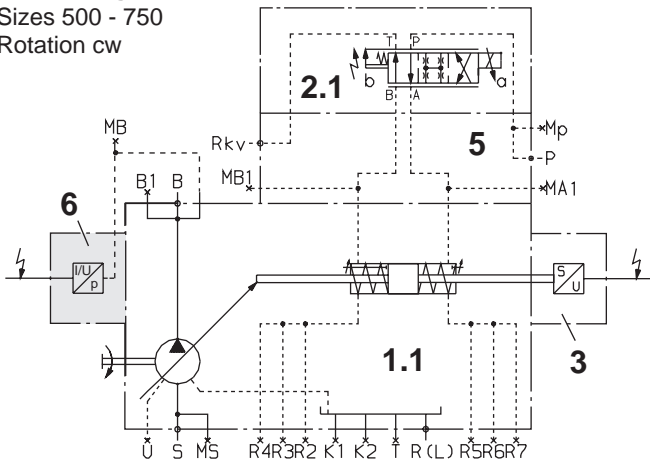
Circuit diagram
Sizes 500-1000
Rotation cw



Circuit diagram
Sizes 500-1000
Rotation a/cw



Circuit diagram HS3P/U
Sizes 500 - 750
Rotation cw



Ports

- A,B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P, S_P Control pressure port
- E Feed (A4VSG)
- R₂ - R₇ Adjust feed (sizes 125-750)
- R_{KV} Control oil return
- M_{A1}, M_{B1}, M_P Control pressure test port (plugged) sizes 500-1000

Components

- 1 Pump with hydraulic control device (see technical data)
- 1.1 A4VSO
- 1.3 A4VSG
- 2.1 4/3-way proportional valve (see RE 30021) for A4VSO-Rotation cw and A4VSG

Size	Type
40 and 71	STW0070 - 1X/D16
125 and 180	STW0070 - 1X/D32
250 and 355	STW0070 - 1X/D40
500 - 1000	STW0048 - 1X/AV42G24Z9M

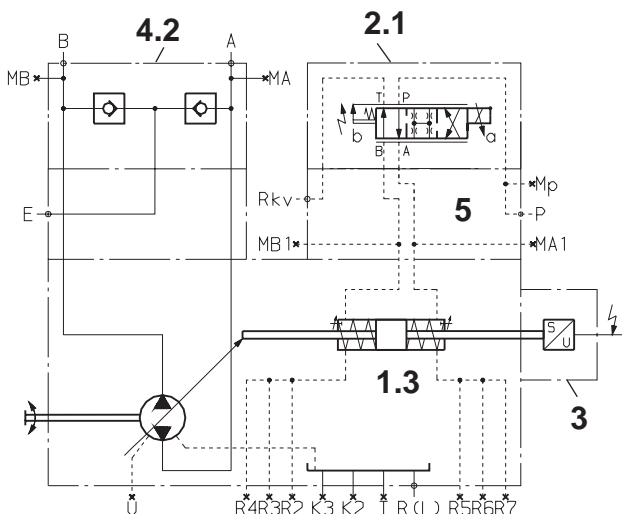
- 2.2 4/3-way proportional valve (see RE 30021) for A4VSO-Rotation a/cw

Size	Type
40 and 71	STW0073 - 1X/D16
125 and 180	STW0073 - 1X/D32
250 and 355	STW0073 - 1X/D40
500 - 1000	STW0048 - 1X/BV42G24Z9M

- 3 Actual value transmitter (inductive positional transducer) Type IW9-03-01
- 4 Anti-cavitation valves (A4VSH)
- 5 Feed valves
- 6 Pressure transducer HM15, for HS3P or Pressure transducer HM14, for HS3U

A4VSG - closed circuit RE 92100

Circuit diagram
Sizes 500-750



Control devices HM, HS and EO Variable displacement pump A4VS, series 1, 2 and 3

Before finalizing your design, please request a certified drawing.
Subject to revision.

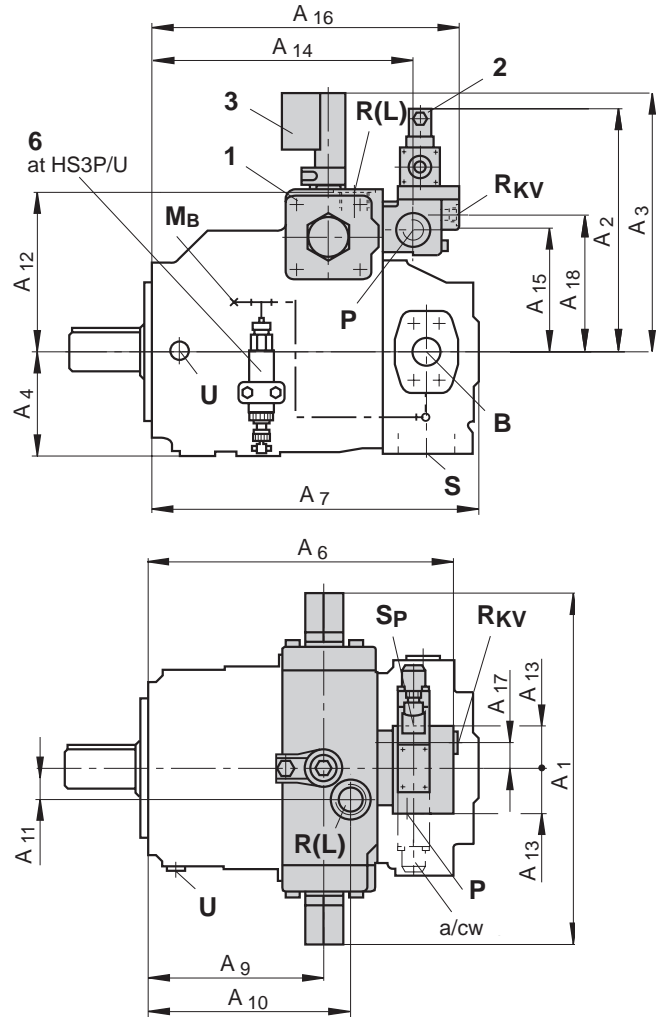
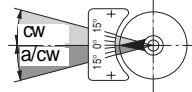
Unit dimensions HS3, Sizes 40 - 355, Series 1 and 2

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

) cf: swivel angle indicator

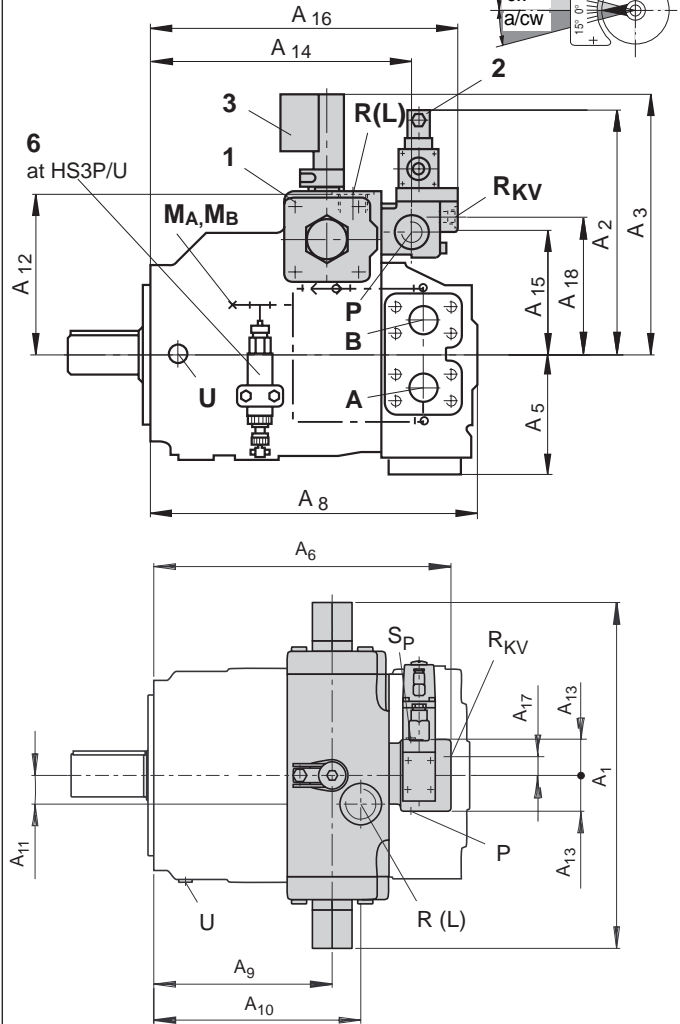
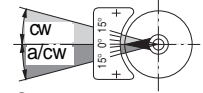


A4VSH - semi-closed circuit - RE 92110 A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	Swivel range*
cw	a/cw
B(S _B) to A	A(S _A) to B
A(S _A) to B	B(S _B) to A

) cf: swivel angle indicator



Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	A ₁₇	A ₁₈
40	296	247	246	91	110	275	269	281	144	169	30	135	43	222	108	273	35	128
71	332	266	265	106	113	300	302	306	166	193	34	152	48	249	123	300	30	143
125	401	283	298	122	133	350	355	363	203	233	36	186	48	298	144	349	30	164
180	401	283	298	122	133	350	379	363	203	233	36	186	48	298	144	349	30	164
250	485	310	345	151	189	412	439	441	248	288	40	233	48	360	172	411	30	192
355	485	310	345	151	191	412	468	468	248	288	40	233	48	360	172	411	30	192

Ports

Size	P, S _P	R _{KV}	R(L)	R ₂₋₇
40	M22x1.5	M22x1.5	M22x1.5	-
71	M22x1.5	M22x1.5	M27x2	-
125	M22x1.5	M22x1.5	M33x2	M10x1
180	M22x1.5	M22x1.5	M33x2	M10x1
250	M22x1.5	M22x1.5	M42x2	M10x1
355	M22x1.5	M22x1.5	M42x2	M10x1

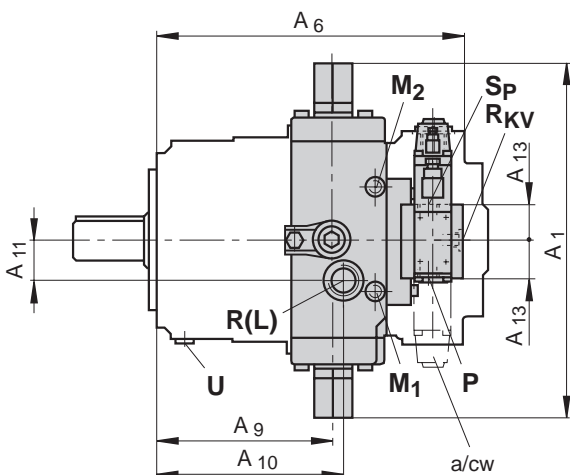
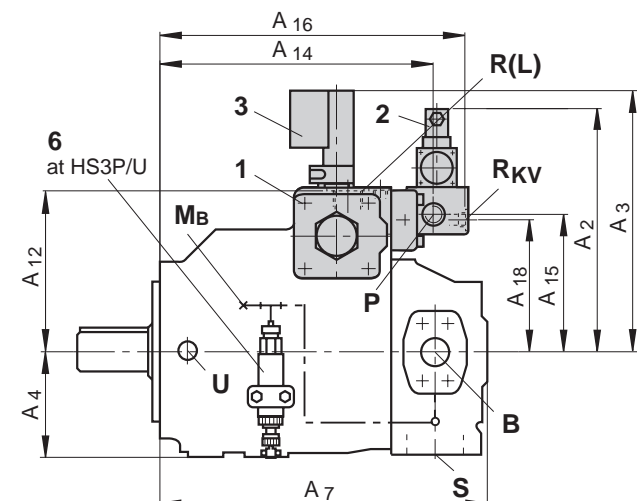
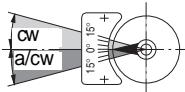
Unit dimensions HS3, Sizes 125 - 355, Series 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

) cf: swivel angle indicator

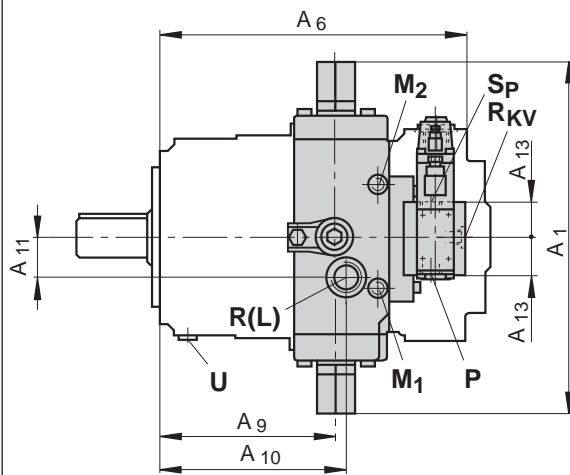
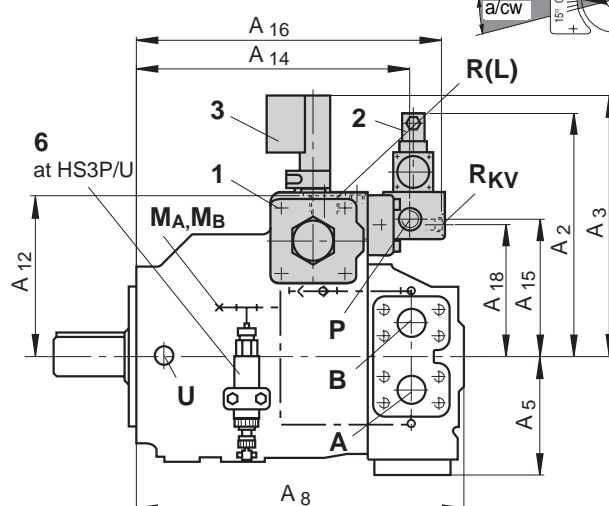
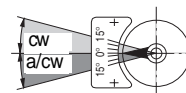


A4VSH - semi-closed circuit - RE 92110 A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	Swivel range*	
cw	a/cw	cw
B(S_B) to A	A(S_A) to B	cw
A(S_A) to B	B(S_B) to A	a/cw

) cf: swivel angle indicator



Unit dimensions (Dimensions in italics are different to series 2)

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	A ₁₈
125	401	283	298	122	133	350	355	363	203	217	50	186	39	310	164	350	148
180	401	283	298	122	133	350	379	363	203	217	50	186	39	310	164	350	148
250	485	319	345	151	189	412	439	441	248	265	55	233	39	372	192	412	184
355	485	319	345	151	191	412	468	468	248	265	55	233	39	372	192	412	184

Ports

Size	P, S _p	R _{KV}	R(L)	R ₂₋₇	M ₁ , M ₂
125	M22x1.5	M22x1.5	M33x2	M10x1	M14x1.5
180	M22x1.5	M22x1.5	M33x2	M10x1	M14x1.5
250	M22x1.5	M22x1.5	M42x2	M10x1	M18x1.5
355	M22x1.5	M22x1.5	M42x2	M10x1	M18x1.5

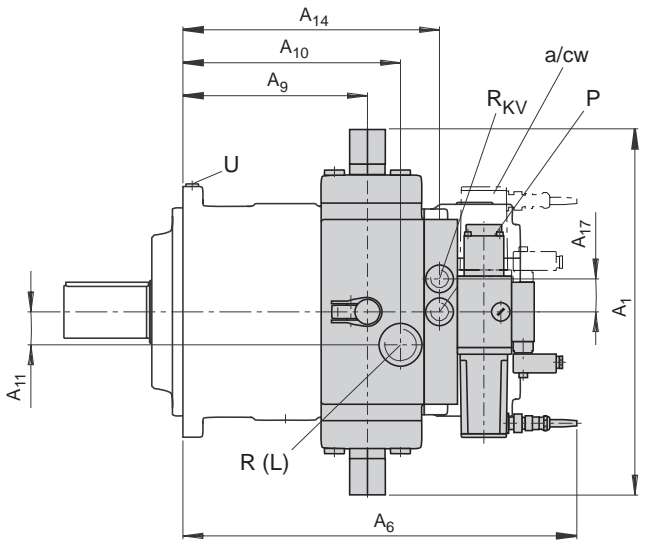
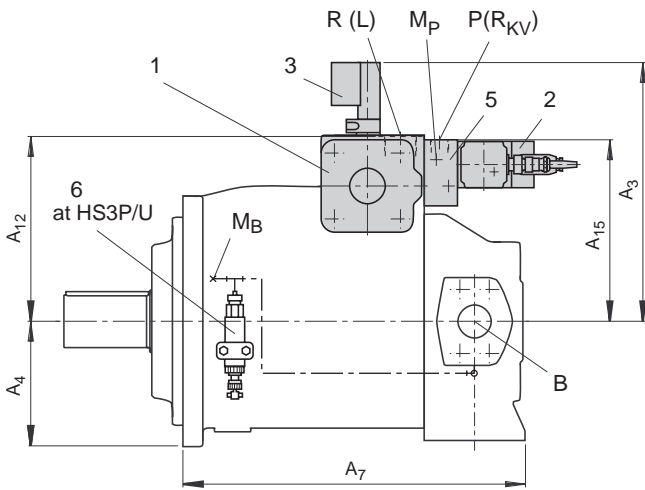
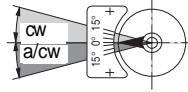
Unit dimensions HS3, Sizes 500 - 750, Series 2 and 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range*
cw	a/cw
a/cw	cw

*) cf: swivel angle indicator

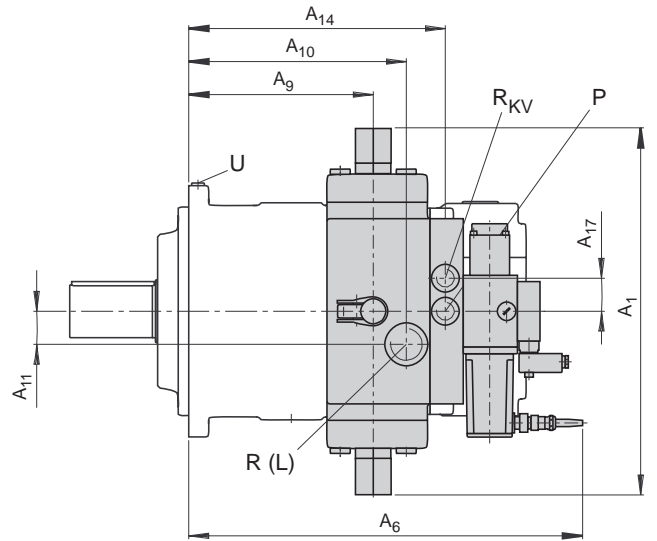
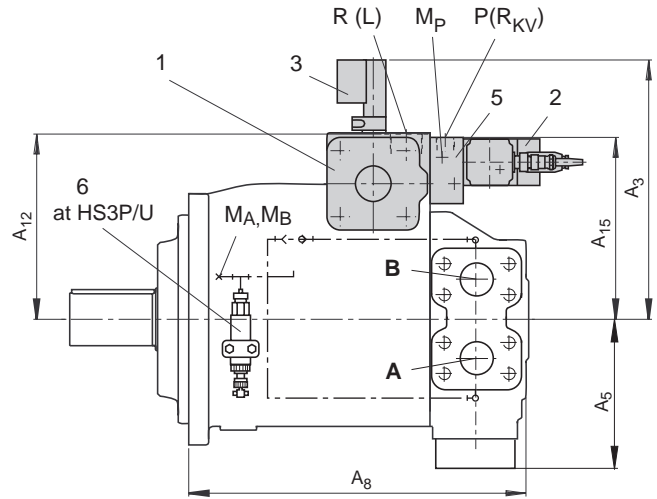
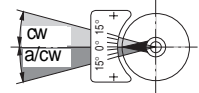


A4VSG - closed circuit - RE 92100

Direction of flow

Rotation	Swivel range*	
cw	a/cw	
B to A	A to B	cw
A to B	B to A	a/cw

*) cf: swivel angle indicator



Unit dimensions

Size	A ₁	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₄	A ₁₅	A ₁₇
500	555	392	190	225	646	520	510	279	329	50	280	388	274	50
750	611	428	232	280	628	564	559	301	351	50	318	420	304	50

Ports

Size	R(L)	R _{KV}	P	M _{A2} , M _{B2} , M _P	R ₂₋₇
500	M48x2	M27x2	M27x2	M14x1.5	M14x1.5
750	M48x2	M27x2	M27x2	M14x1.5	M14x1.5

Variation E without valves

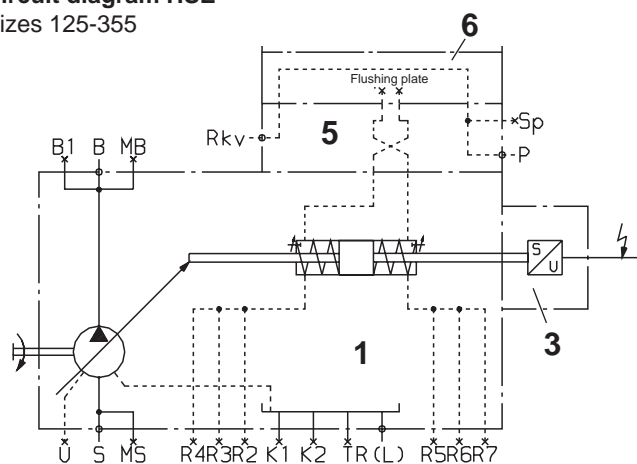
This control is supplied without servo or proportional valve.
In all other respects this variant corresponds to the basic model.
For technical data, further circuit diagrams and unit dimensions
see basic model.

HSE / HS1E

Mounting pattern DIN 24340-A10 is used with all sizes for
mounting the servo valve.

Circuit diagram HSE

Sizes 125-355



HS3E / EO1E / EO2E

Proportional valve mounting:

A **mounting pattern to DIN 24340-A6** is used for sizes 40 - 355
and to **DIN 24340-A10** for sizes 500 - 1000.

Components

- 1 Pump with hydraulic control device
- 3 Actual value transmitter (inductive positional transducer)
Type IW9-03-01
- 5 Sandwich plate
- 6 Flushing plate (Types HSE and HS1E only)

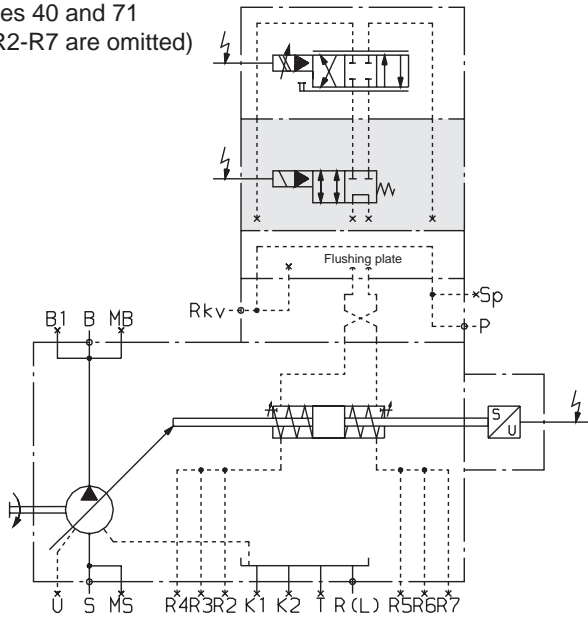
Variation **K** with short circuit valve

The short circuit facility is used for setting and adjusting operations in the non-pressurized zero position but without defined return when operating a high pressure - **no emergency stop function**.

HSK / HS1K

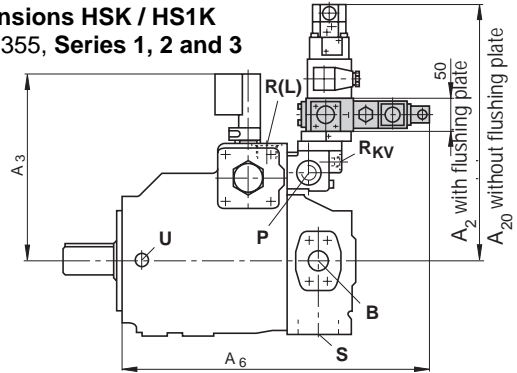
Example of HSK / Series 2

Sizes 125-355
(on sizes 40 and 71 ports R2-R7 are omitted)

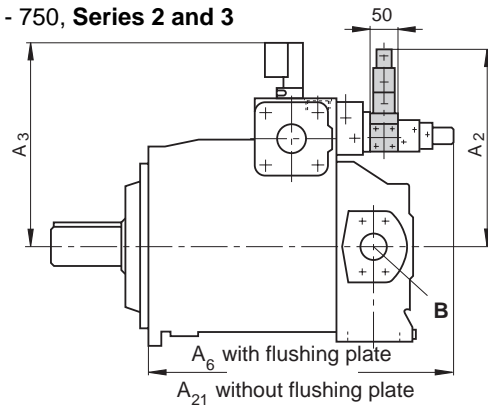


Short circuit valve (4/2-way directional cut-off-valve)
Type Z4WEH10E68-4X/6AG24NETZ4/D2 (see RE 24753)

Unit dimensions HSK / HS1K Sizes 40 - 355, Series 1, 2 and 3



Sizes 500 - 750, Series 2 and 3



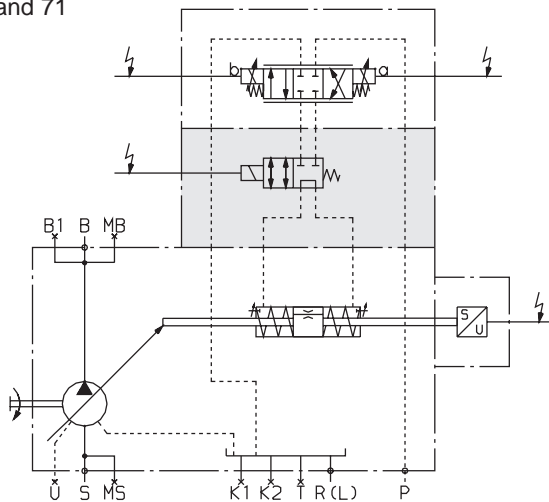
Size	40	71	125	180	250	355	500	750
A ₂	322	337	350	350	386	386	373	373
A ₃	246	265	298	298	345	345	392	430
A ₆	417	444	493	493	555	555	583	615
A ₂₀	307	322	343	343	371	371	-	-
A ₂₁	402	429	478	478	540	540	568	600

HS3K / EO1K / EO2K Series 1 and 2

Size 40 - 355

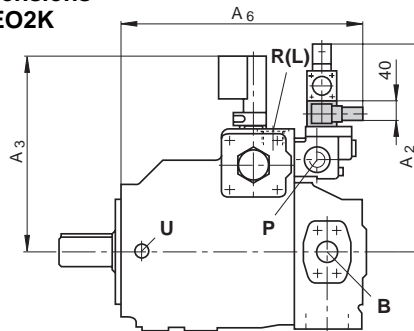
Example of EO1K / Series 1

Sizes 40 and 71

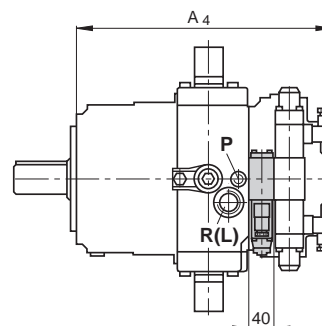


Short circuit valve (4/2-way directional cut-off-valve)
Type Z4WE6E68-2X/AG24N24 direct operated
(see RE 23185)
Please adhere to the power limits specified in RE 23185.

Unit dimensions HS3K / EO2K

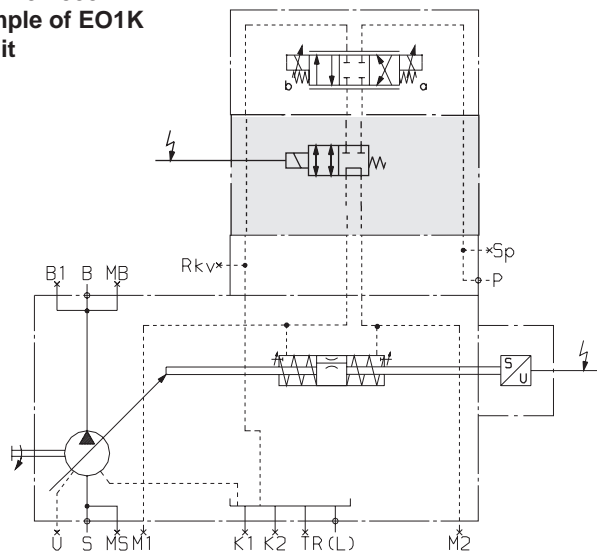


EO1K



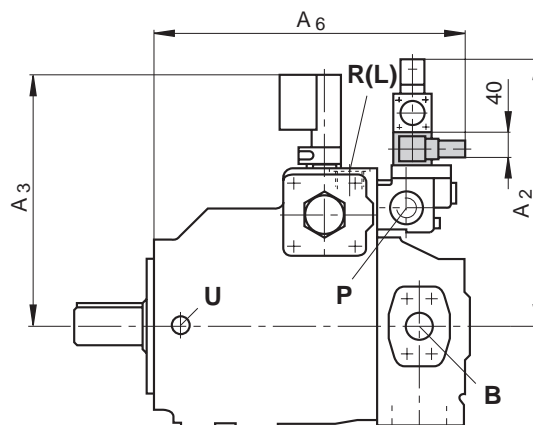
HS3K / EO1K / EO2K Series 3

Size 125 - 355
Example of EO1K circuit



Short circuit valve (4/2-way directional cut-off-valve)
Type Z4WE6E68-2X/AG24NZ4 direct operated
(see RE 23185)
Please adhere to the power limits specified in RE 23185.

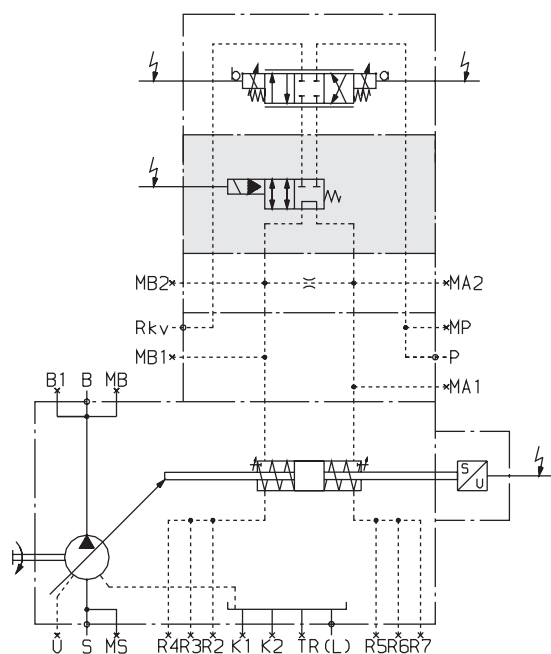
Unit dimensions
HS3K / EO1K / EO2K



Size	125	180	250	355
A ₂	327	327	355	355
A ₃	298	298	345	345
A ₆	373	373	435	435

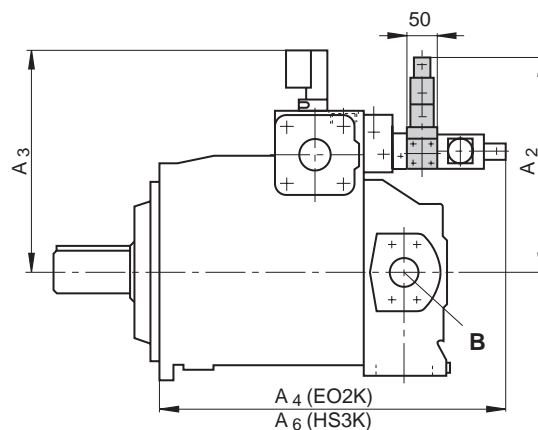
HS3K / EO2K Series 2 and 3

Size 500 - 1000
Example of EO2K circuit
Sizes 500



Short circuit valve (4/2-way directional cut-off-valve)
Type Z4WEH10E68-4X/6AG24NETZ4D2
(see RE 24753)

Unit dimensions
HS3K / EO2K



Size	40	71	125	180	250	355	500	750	1000
A ₂	291	306	327	327	355	355	400	429	453
A ₃	246	265	298	298	345	345	392	428	456
A ₄	320	347	396	396	458	458	613	-	-
A ₆	305	324	373	373	435	435	646	678	744

Variation Z Sandwich plate filter see model code filtration

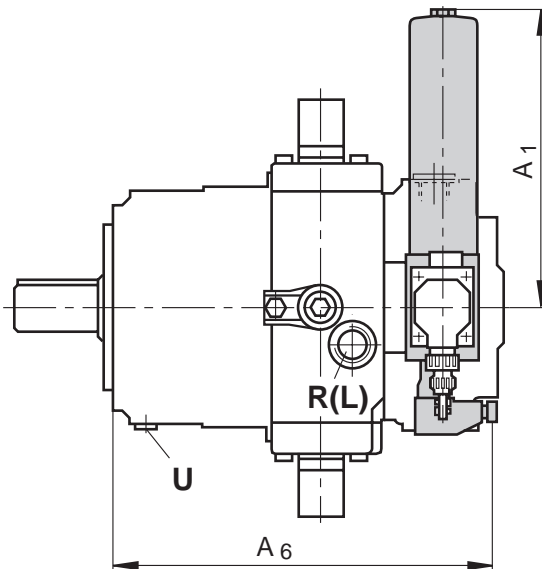
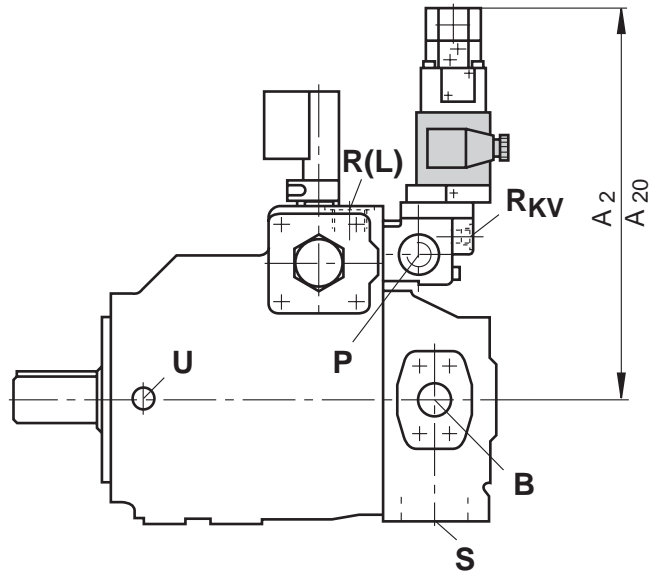
The sandwich plate filter is used for filtering applications upstream of the servo valve on the HS and the HS1 and is available for sizes 40-355. To order enter **Z** under Model Code Filtration.

Unit dimensions HS...Z

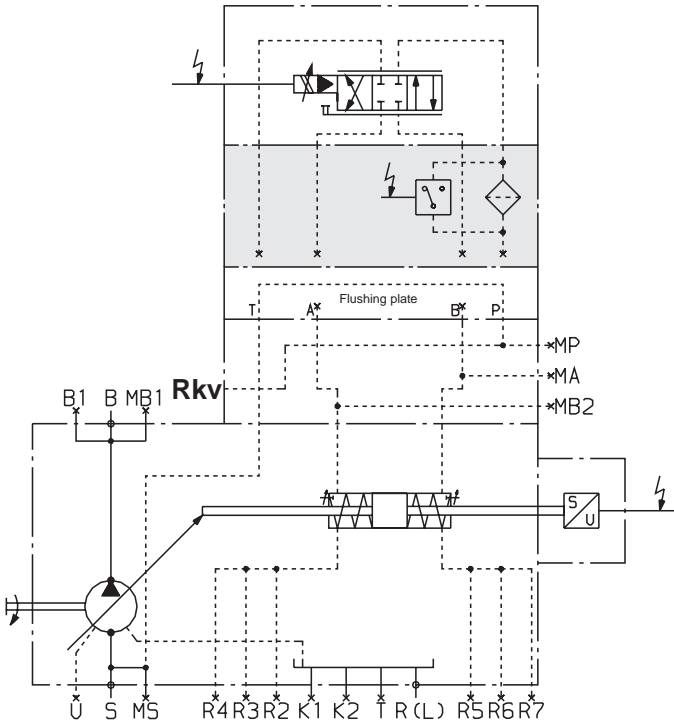
Sandwich plat filter

Optical contamination indicator.

Size	Type
40 and 71	DFBH/HC60Z10D1.0/L24-V
125 - 355	DFBH/HC110Z10D1.0/L24-V



Circuit diagram HS...Z



Unit dimensions

Size	A ₁	A ₂	A ₆	A ₂₀
	(with flushing plate)			(without flushing plate)
40	217	342	300	327
71	217	357	327	342
125	272	378	376	363
180	272	378	376	363
250	272	406	438	391
355	272	406	438	391

EO 1

Hydraulic adjustment with proportional valve for electronic flow adjustment using VT 5035

In the EO 1 electronic control operating the pump flow is set by means of an electrically controlled proportional directional valve, whilst the position of the pump is signalled via an inductive positional transducer.

A swivel angle limit of $V_{g \max}$ to $\% V_{g \max}$ and spring centering of the hydraulic control cylinder are standard. **Spring centring** is used for **setting and adjusting in the unpressurized zero position**, but without defined reset in high pressure operation. Amplifier card VT 5035 (see RE 29955) should be ordered separately.

If the unit is supplied together with the electronic control, the amplifier card will already have undergone suitable adjustment at the factory. If the amplifier card is supplied separately, the commissioning instructions (included with the pump) should be followed.

Technical data

Size		40	71	125	250
Control movement s_{\max}	mm	14.2	17.1	20.7	25.9
Control area A	cm ²	16.6	24.6	36.3	56.7
Control volume $V_{S \max}$	cm ³	23.6	42.1	75.2	147
Min. control pressure p_{\min} in P	bar	20	20	20	20
Max. permissible control pressure p_{\max} in P	bar	100	100	100	100
Control time t_{\min}^*	s	0.12	0.20	0.22	0.40

* at 50 bar control pressure

Please note: On the A4VSO pump for open circuit applications (swivel to one side only) the $V_{g \min}$ stop is set so that, when port B is plugged, a pressure of approx. 20 bar is set.

Components

- 1 Pump with hydraulic control device (see technical data)
 - 1.1 A4VSO
 - 1.2 A4VSH
 - 1.3 A4VSG
- 2 4/3-way proportional valve (see RE 29054)

Size	Type
40 and 71	4WRA6E10-10/24NZ4M
125 and 250	4WRA6E20-10/24NZ4M

- 3 Actual value transmitter (inductive positional transducer)
 - Type IW9-03-01
- 4.1 Anti-cavitation valves (A4VSH)
- 4.2 Feed valves

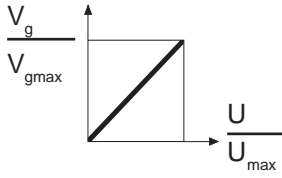
Ports

- A, B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P Control pressure port
- R_{kv} Control oil return (plugged) Series 30
- S_A, S_B Anti-cavitation valve port (A4VSH)
- E Feed (A4VSG)
- M₁, M₂ Control pressure test port (plugged), Sizes 125 - 355 Series 30

Series 1 and 2

A4VSO - open circuit - RE 92050 - Series 1 and 2

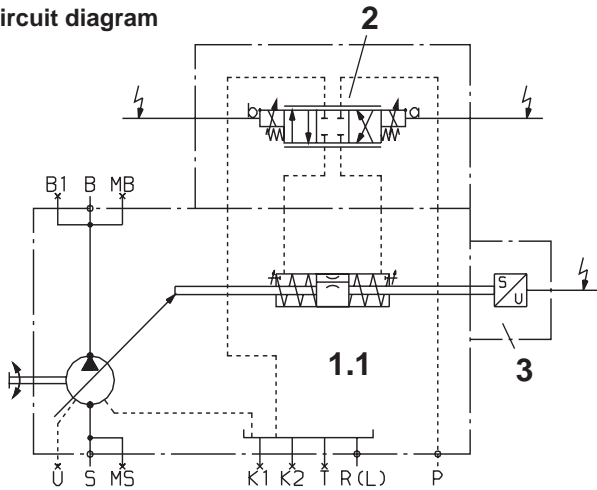
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

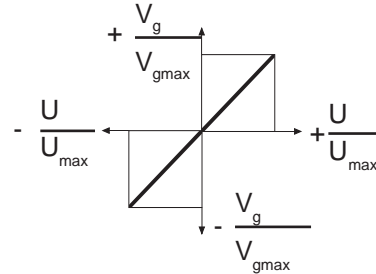
Values applicable for constant operating temperature of 50 °C.

Circuit diagram



A4VSH - semi-closed circuit - RE 92110 - Series 1 and 2

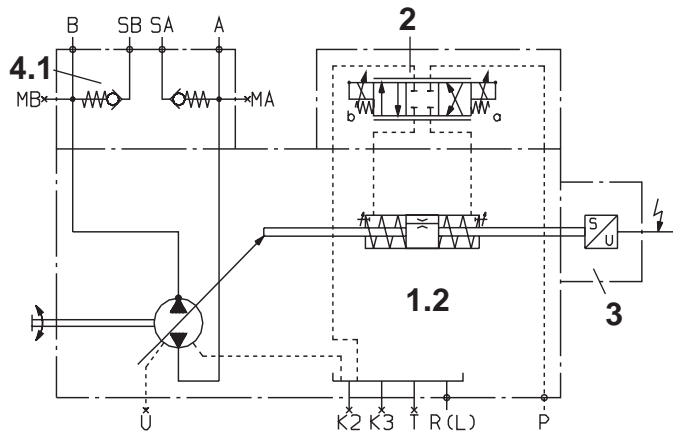
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram



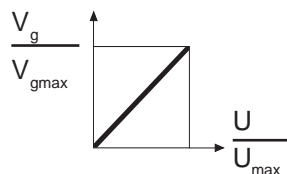
Ports

- A, B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P Control pressure port
- R_{kv} Control oil return (plugged) Series 30
- S_A, S_B Anti-cavitation valve port (A4VSH)
- E Feed (A4VSG)

Series 3

A4VSO - open circuit - RE 92050

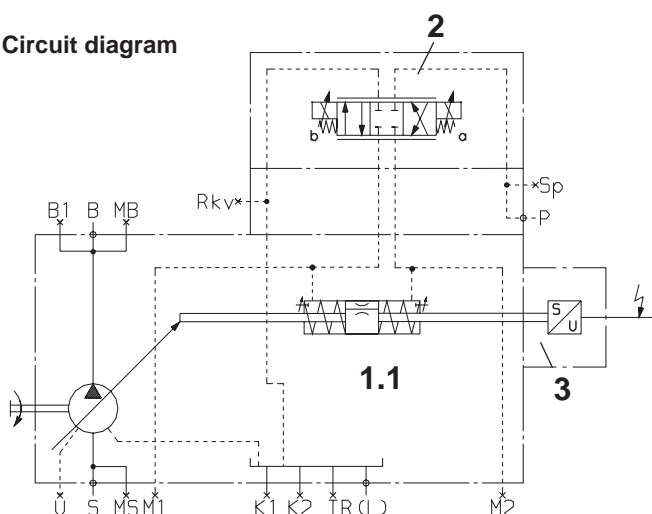
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

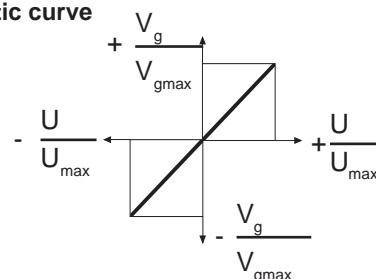
Values applicable for constant operating temperature of 50 °C.

Circuit diagram



A4VSH - semi-closed circuit - RE 92110

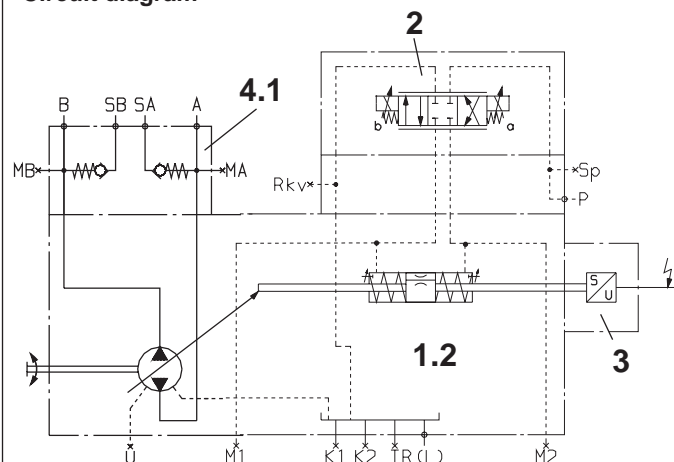
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram



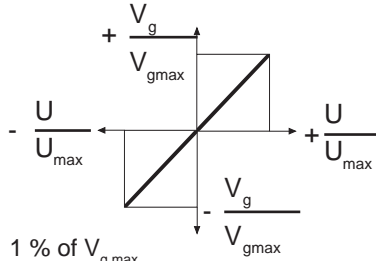
Ports

A, B	Pressure port
B ₁	Auxiliary port (plugged)
S	Suction port (A4VSO)
K ₁ , K ₂ , K ₃	Flushing port (plugged)
M _A , M _B	Operating pressure test port (plugged)
M _S	Suction pressure test port (plugged)
R (L)	Oil filling port and bleed (case drain port)
T	Oil drain (plugged)
U	Flushing port (plugged)
P	Control pressure port
R _{kv}	Control oil return (plugged) Series 30
S _A , S _B	Anti-cavitation valve port (A4VSH)
E	Feed (A4VSG)
M ₁ , M ₂	Control pressure test port (plugged), Sizes 125 - 355 Series 30

EO1, Series 1 and 2

A4VSG - closed circuit - RE 92100

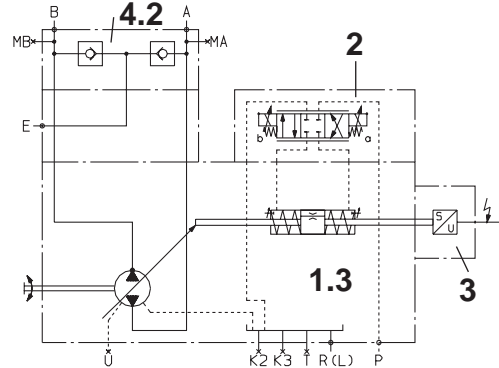
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram



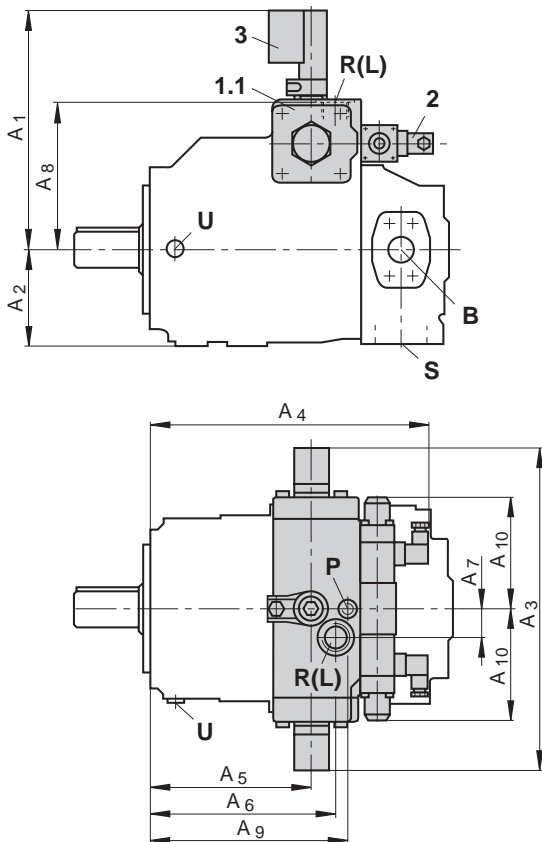
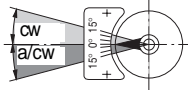
Unit dimensions

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range ¹⁾ / solenoid operation
cw	a/cw/ a
a/cw	cw/ b

¹⁾ cf: swivel angle indicator

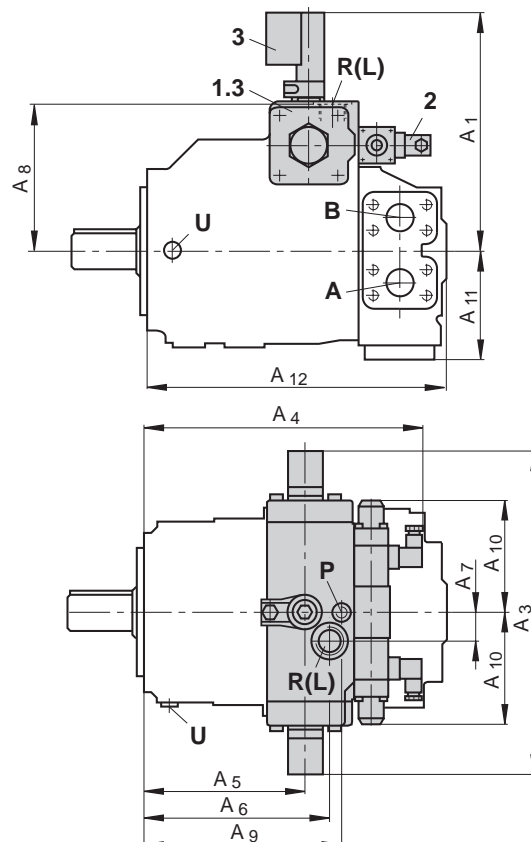
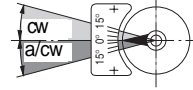


A4VSH - semi-closed circuit - RE 92110 A4VSG - closed circuit - RE 92100

Direction of flow

Swivel range ¹⁾ / solenoid operation	Rotation	a/cw
cw/b	B to A	A to B
a/cw/a	A to B	B to A

¹⁾ cf: swivel angle indicator



Unit dimensions

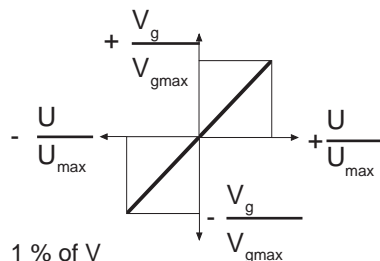
Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	P	R(L)
40	245	91	296	279	144	169	30	135	178	140	110	281	M14x1.5	M22x1.5
71	265	106	332	306	166	193	34	152	205	140	113	306	M14x1.5	M27x2
125	298	120.5	401	355	203	233	36	185.5	249	140	133	363	M18x1.5	M33x2
250	340	151	485	417	248	288	40	232	314	140	194	441	M18x1.5	M42x2

Ports

EO1, Series 3

A4VSG - closed circuit - RE 92100

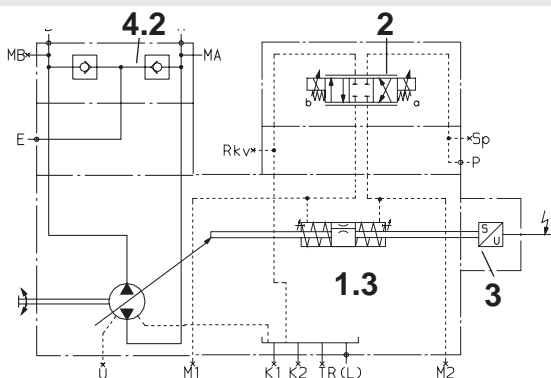
Characteristic curve



Max. hysteresis $\Delta V_g \leq \pm 1\%$ of V_{gmax}
 Min. repeatability $\leq \pm 0.5\%$ of V_{gmax}
 Linearity deviation $\leq 2\%$ of V_{gmax}

Values applicable for constant operating temperature of 50 °C.

Circuit diagram



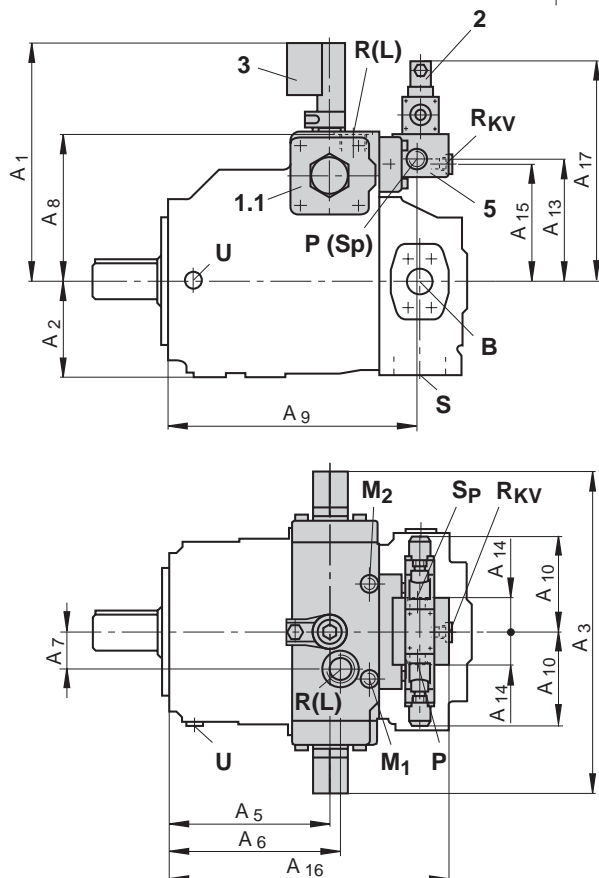
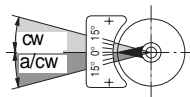
Unit dimensions

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range ¹⁾ / solenoid operation
cw	a/cw/ a
a/cw	cw/ b

¹⁾ cf: swivel angle indicator

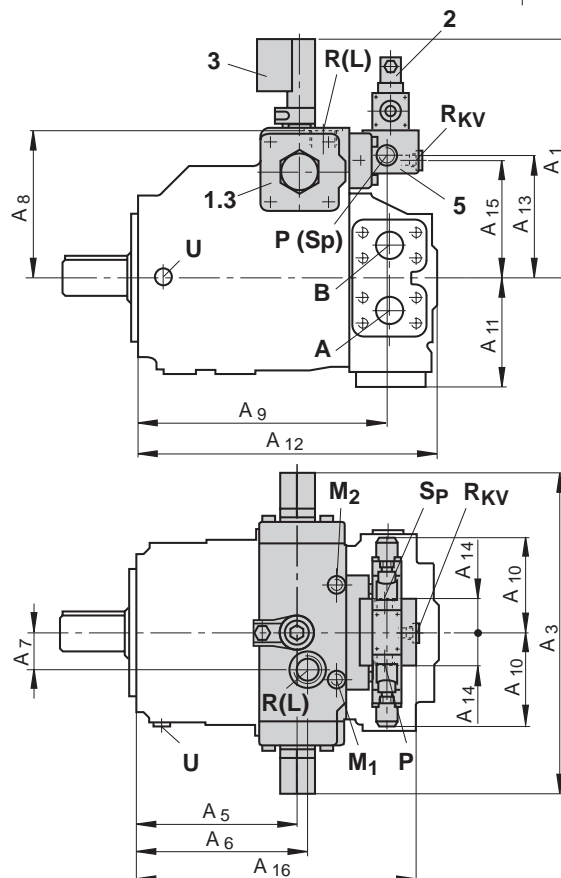
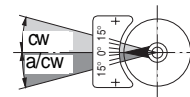


A4VSH - semi-closed circuit - RE 92110 A4VSG - closed circuit - RE 92100

Direction of flow

Swivel range ¹⁾ / solenoid operation	Rotation	
	cw	a/cw
cw/b	B to A	A to B
a/cw/a	A to B	B to A

¹⁾ cf: swivel angle indicator



Unit dimensions (Dimensions in italics are different to series 2)

Size	A ₁	A ₂	A ₃	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	A ₁₇	P	R(L)	M ₁ , M ₂
125	298	120.5	401	203	217	50	185.5	310	140	133	363	164	39	156	350	283	M18x1.5	M33x2	M14x1.5
250	340	151	485	248	265	55	232	372	140	194	441	192	39	184	412	319	M18x1.5	M42x2	M18x1.5

EO 2

Hydraulic adjustment with proportional valve for electronic flow adjustment using VT 5035

In the EO 2 electronic control operating the pump flow is set by means of an electrically controlled proportional directional valve, whilst the position of the pump is signalled via an inductive positional transducer.

A swivel angle limit of $V_{g \max}$ to % $V_{g \max}$ and spring centering of the hydraulic control cylinder are standard. **Spring centring** is used for **setting and adjusting in the unpressurized zero position**, but without defined reset in high pressure operation.

In order to minimize the oil quantity required by the control cylinders, the cylinder chambers are sealed on sizes 125 - 750. Amplifier card VT 5035 (see RE 29955) for regulating the pump flow. Not part of EO 2. Please order separately.

If the unit is supplied together with the electronic control, the amplifier card will already have undergone suitable adjustment at the factory. If the amplifier card is supplied separately, the commissioning instructions (included with the pump) should be followed.

Technical data

Size	40	71	125	180	250	355	500	750
Control movement s_{\max} mm	14.2	17.1	20.7	20.7	25.9	25.9	32.6	37.0
Control area A cm ²	8.1	12.6	18.1	18.1	28.3	28.3	38.2	56.8
Control volume $V_{S \max}$ cm ³	11.4	21.5	37.5	37.5	73.2	73.2	124.5	210
Min. control pressure bar	100	100	100	125	125	125	150	150
p_{\min} in P								
Max. permissible control pressure bar	315	315	315	315	315	315	315	315
p_{\max} in P								
Control time t_{\min}^* s	0.1	0.12	0.2	0.2	0.25	0.25	0.3	0.5
Approx. weight (A4VSO with EO2) kg		60	96	112	195	215	333	

* at minimum control pressure

The max. permitted control pressure in P of 315 bar is determined by the permissible pressure for the proportional valve

Components

- 1 Pump with hydraulic control device (see technical data)
 - 1.1 A4VSO
 - 1.2 A4VSH
 - 1.3 A4VSG
- 2 4/3-way proportional valve (see RE 29054)

Size	Type
40 and 71	4WRA6E10-1X/24NZ4M
125 - 355	4WRA6E20-1X/24NZ4M
500 and 750	4WRE10E32-1X/24ZM-SO93
- 3 Actual value transmitter (inductive positional transducer) Type IW9-03-01
 - 4.1 Anti-cavitation valves
 - 4.2 Feed valves
- 5 Sandwich plate
- 6 Throttle plate (sizes 500 and 750)

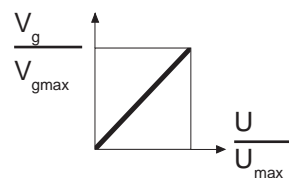
Ports

- A, B Pressure port
- B₁ Auxiliary port (plugged)
- S Suction port (A4VSO)
- K₁, K₂, K₃ Flushing port (plugged)
- M_A, M_B Operating pressure test port (plugged)
- M_S Suction pressure test port (plugged)
- R (L) Oil filling port and bleed (case drain port)
- T Oil drain (plugged)
- U Flushing port (plugged)
- P, S_P Control pressure port
- S_A, S_B Anti-cavitation valve port (A4VSH)
- E Feed (A4VSG)
- R₂ - R₇ Bleed adjustment (sizes 125-750)
- R_{kv} Control oil return (for sizes 40-355 plugged)
- M_{A1}, M_{B1}, M_P Control pressure test port (sizes 500 and 750)
- M₁, M₂ Control pressure test port (plugged), Sizes 125 - 355 Series 30

Please note: On the A4VSO pump for open circuit applications (swivel to one side only) the $V_{g \min}$ stop is set so that, when port B is plugged, a pressure of approx. 20 bar is set.

A4VSO - open circuit RE 92050 - Series 1 and 2

Characteristic curve

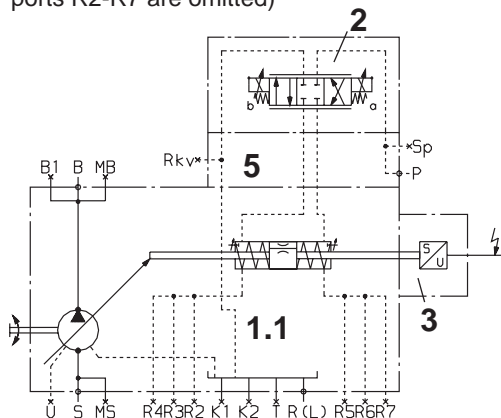


- Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g \max}$
- Min. repeatability $\leq \pm 0.5\%$ of $V_{g \max}$
- Linearity deviation $\leq 2\%$ of $V_{g \max}$

Values applicable for constant operating temperature of 50 °C.

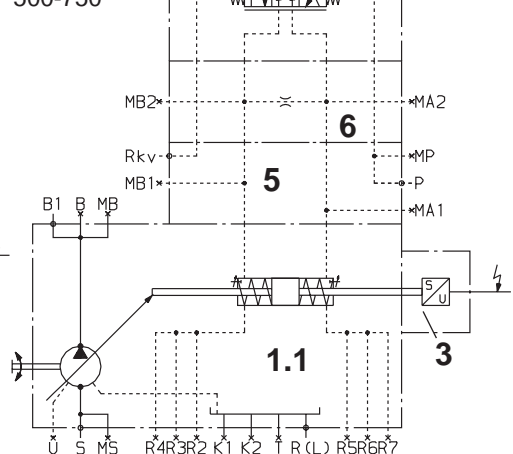
Circuit diagram

Sizes 40-355 (on sizes 40 and 71 ports R2-R7 are omitted)



Circuit diagram

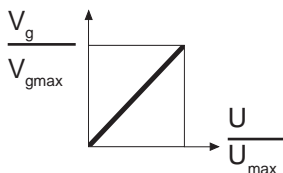
Sizes 500-750



Series 3

A4VSO - open circuit RE 92050

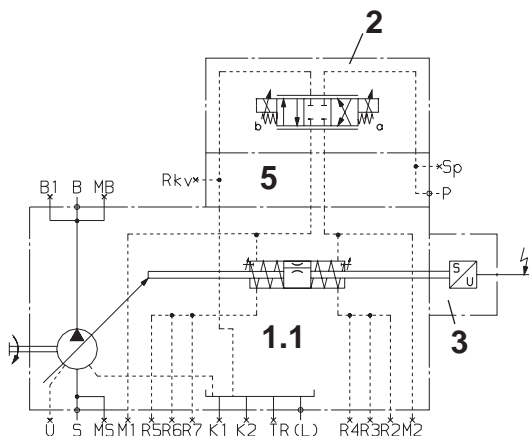
Characteristic curve



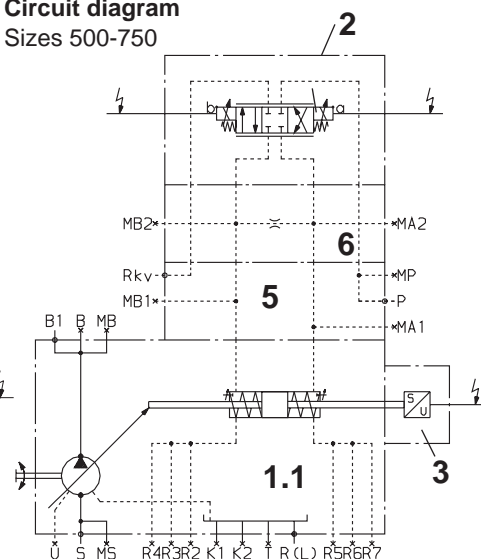
- Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g,max}$
- Min. repeatability $\leq \pm 0.5\%$ of $V_{g,max}$
- Linearity deviation $\leq 2\%$ of $V_{g,max}$

Values applicable for constant operating temperature of 50 °C.

Circuit diagram Sizes 125-355



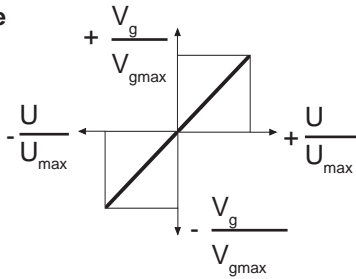
Circuit diagram Sizes 500-750



Series 1 and 2

A4VSH - semi-closed circuit RE 92110 - EO2

Characteristic curve

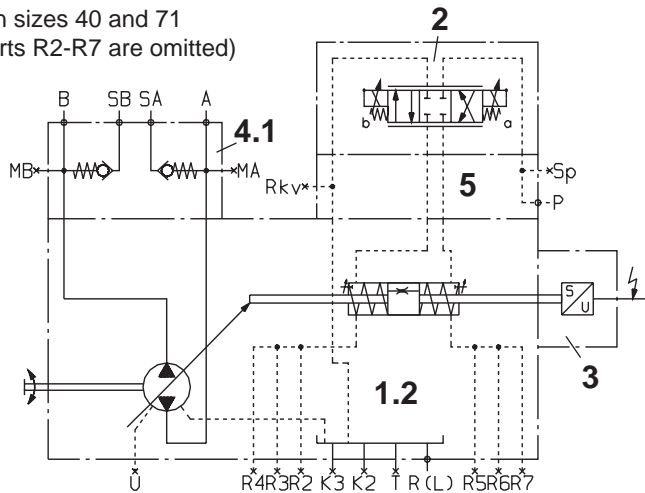


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

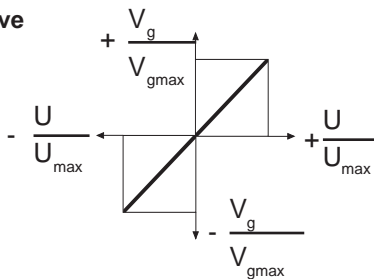
Circuit diagram

Sizes 40-125 and 250
 (on sizes 40 and 71
 ports R2-R7 are omitted)



A4VSG - closed circuit RE 92100 - EO2

Characteristic curve

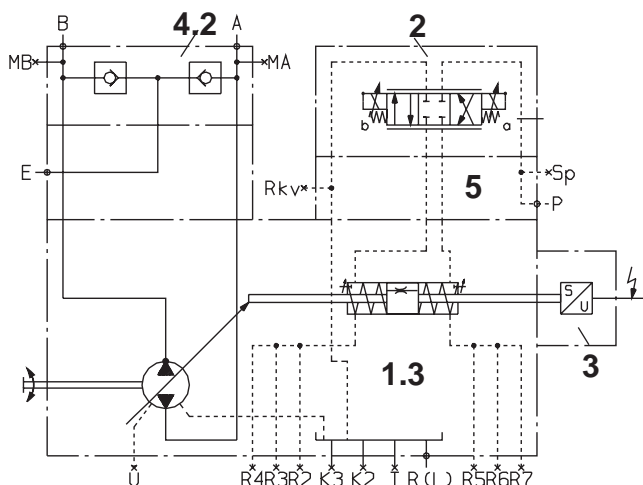


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

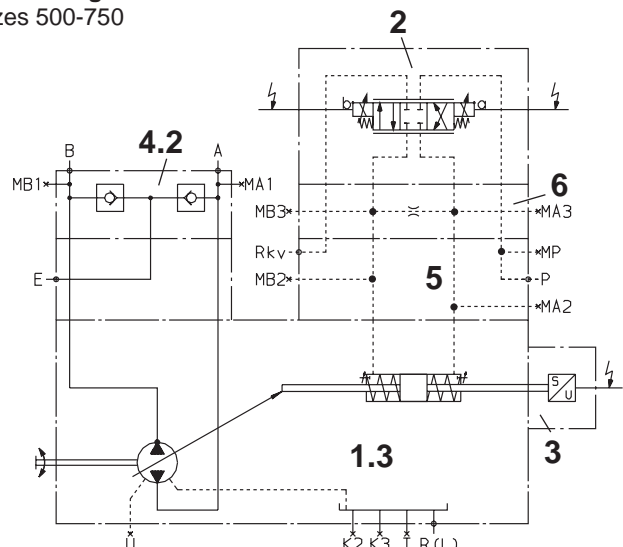
Circuit diagram

Sizes 40-355
 (on sizes 40 and 71 ports R2-R7 are omitted)



Circuit diagram

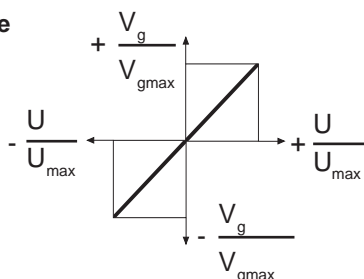
Sizes 500-750



Series 3

A4VSH - semi-closed circuit RE 92110 - EO2

Characteristic curve

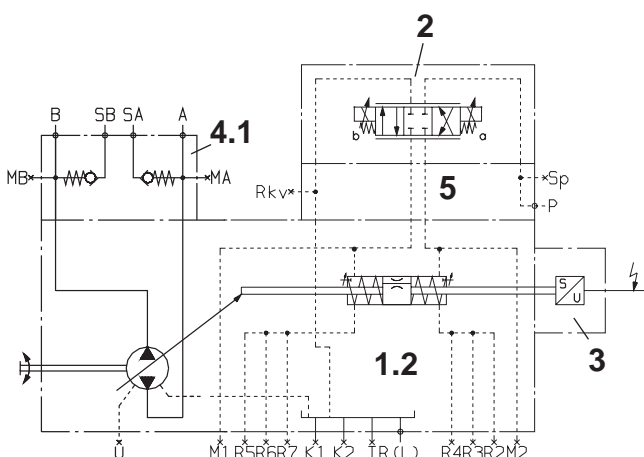


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

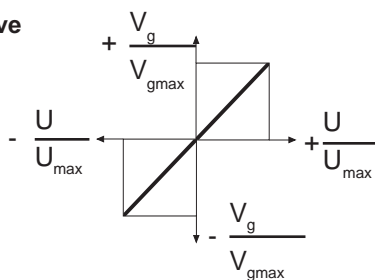
Circuit diagram

Sizes 125 and 250



A4VSG - closed circuit RE 92100 - EO2

Characteristic curve

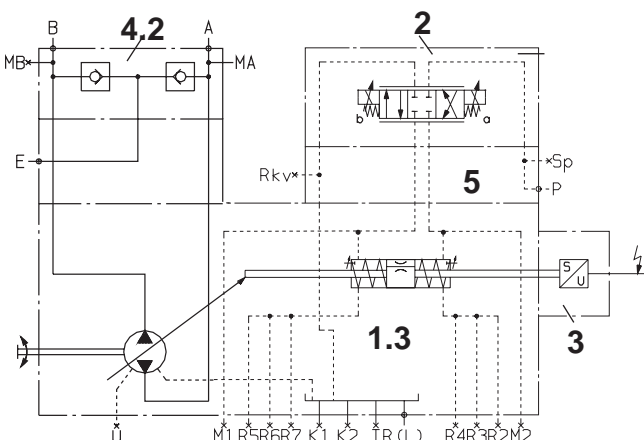


Max. hysteresis $\Delta V_g \leq \pm 1\%$ of $V_{g\max}$
 Min. repeatability $\leq \pm 0.5\%$ of $V_{g\max}$
 Linearity deviation $\leq 2\%$ of $V_{g\max}$

Values applicable for constant operating temperature of 50 °C.

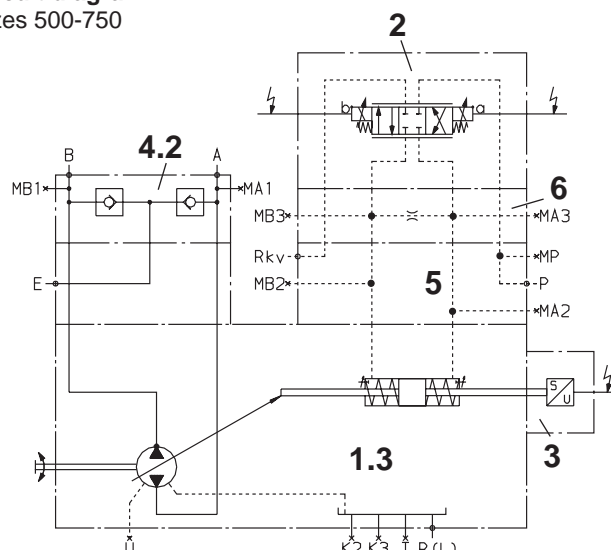
Circuit diagram

Sizes 125-355



Circuit diagram

Sizes 500-750



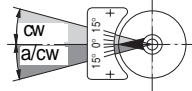
EO2, Sizes 40 - 355, Series 1 and 2

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range ¹⁾ / solenoid operation
cw	a/cw/ a
a/cw	cw/ b

¹⁾ cf: swivel angle indicator



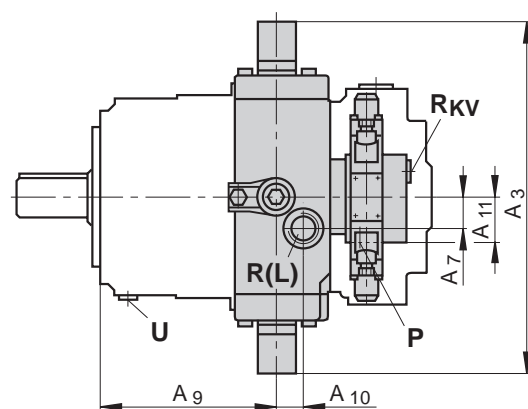
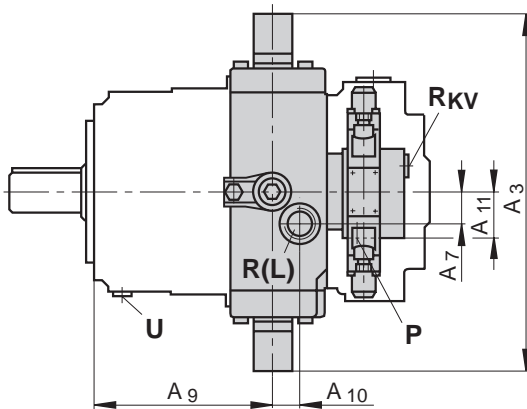
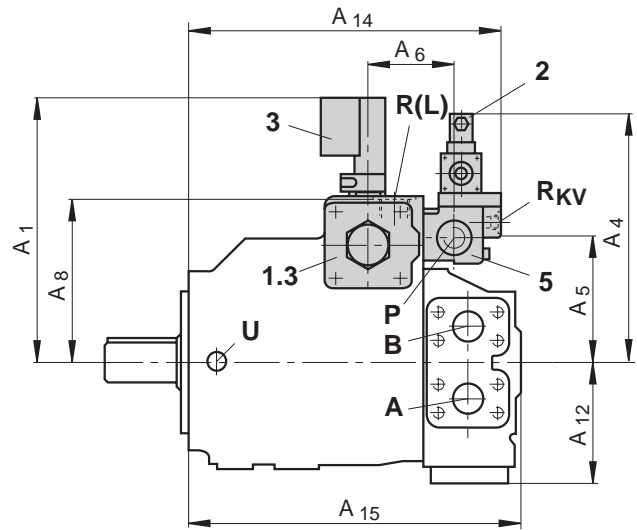
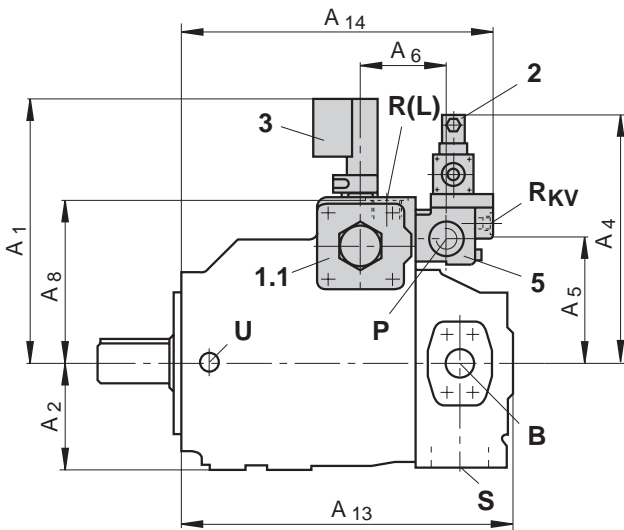
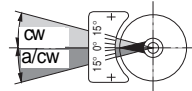
A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100

Direction of flow

Swivel range ¹⁾ / solenoid operation	Rotation	
cw/b	cw	a/cw
a/cw/a	B to A	A to B

¹⁾ cf: swivel angle indicator



Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	Ports R _{kv} , P, S _p	R(L)
40	246	91	296	251	108	78	30	135	144	25	30	110	269	278	281	M22x1.5	M22x1.5
71	265	106	332	266	123	83	34	152	166	27	34	113	298	305	306	M22x1.5	M27x2
125	298	120.5	401	287	144	95	36	185.5	203	30	36	133	355	354	363	M22x1.5	M33x2
180	298	120.5	401	287	144	95	48	185.5	203	30	36	133	379	354	363	M22x1.5	M33x2
250	345	151	485	315	172	112	48	233	248	40	48	189	439	416	441	M22x1.5	M42x2
355	345	151	485	315	172	112	48	233	248	40	48	191	468	416	468	M22x1.5	M42x2

Ports

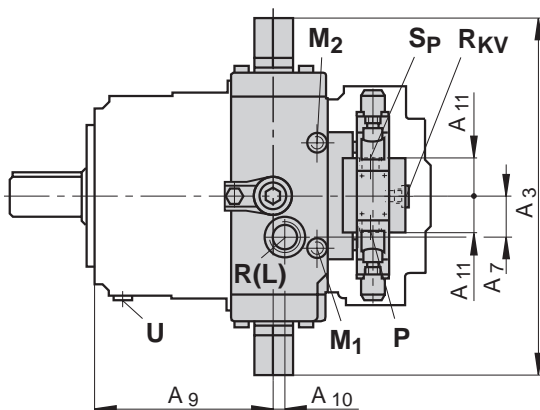
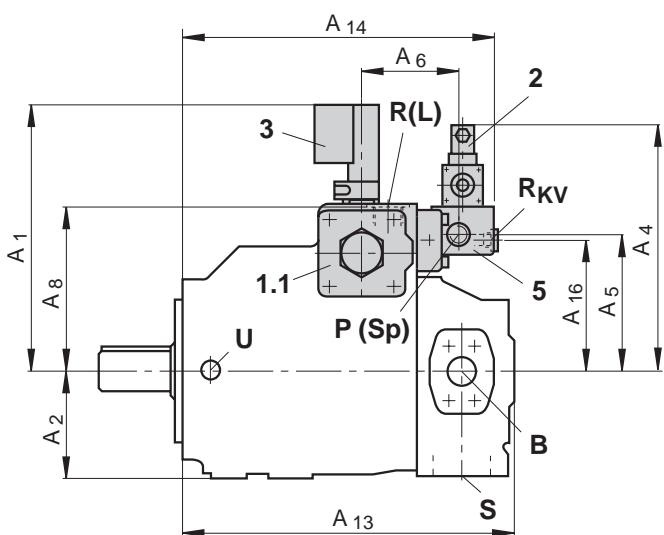
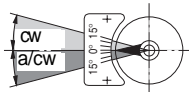
EO2, Sizes 40 - 355, Series 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range ¹⁾ / solenoid operation
cw	a/cw/ a
a/cw	cw/ b

¹⁾ cf: swivel angle indicator

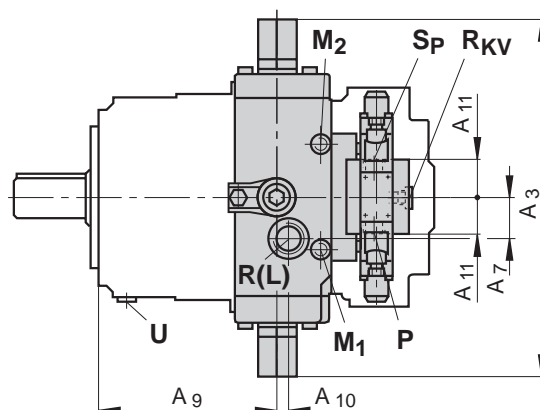
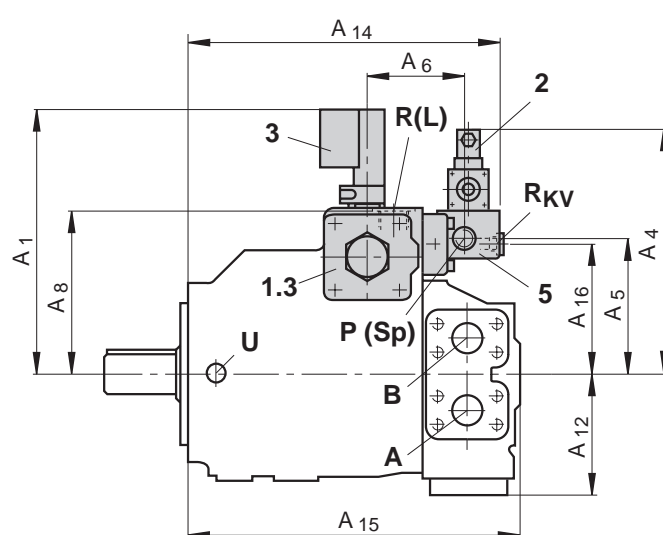
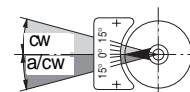


A4VSH - semi-closed circuit - RE 92110 A4VSG - closed circuit - RE 92100

Direction of flow

Swivel range ¹⁾ / solenoid operation	Rotation	
	cw	a/cw
cw/b	B to A	A to B
a/cw/a	A to B	B to A

¹⁾ cf: swivel angle indicator



Unit dimensions (Dimensions in italics are different to series 2)

Size	Ports																			
	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	A ₁₆	R _{kv}	P, S _P	R(L)	M ₁ , M ₂
125	298	120.5	401	283	156	107	50	185.5	203	14	36	133	355	350	363	148	M22x1.5	M33x2	M14x1.5	M14x1.5
180	298	120.5	401	283	156	107	50	185.5	203	14	36	133	379	350	363	148	M22x1.5	M33x2	M14x1.5	M14x1.5
250	345	151	485	319	192	124	55	233	248	17	48	189	439	412	441	184	M22x1.5	M42x2	M18x1.5	M18x1.5
355	345	151	485	319	192	124	55	233	248	17	48	191	468	412	468	184	M22x1.5	M42x2	M18x1.5	M18x1.5

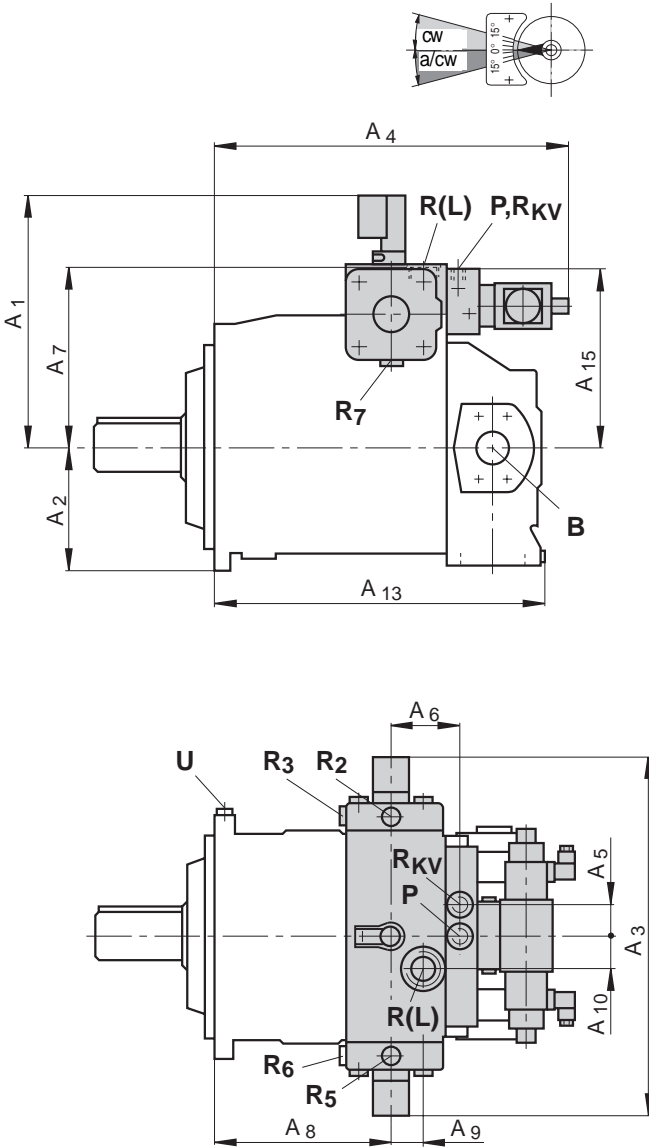
Unit dimensions EO2, Sizes 500, Series 2 and 3

A4VSO - open circuit - RE 92050

Direction of flow S to B

Rotation	Swivel range ¹⁾ / solenoid operation
cw	a/cw/ a
a/cw	cw/ b

¹⁾ cf: swivel angle indicator



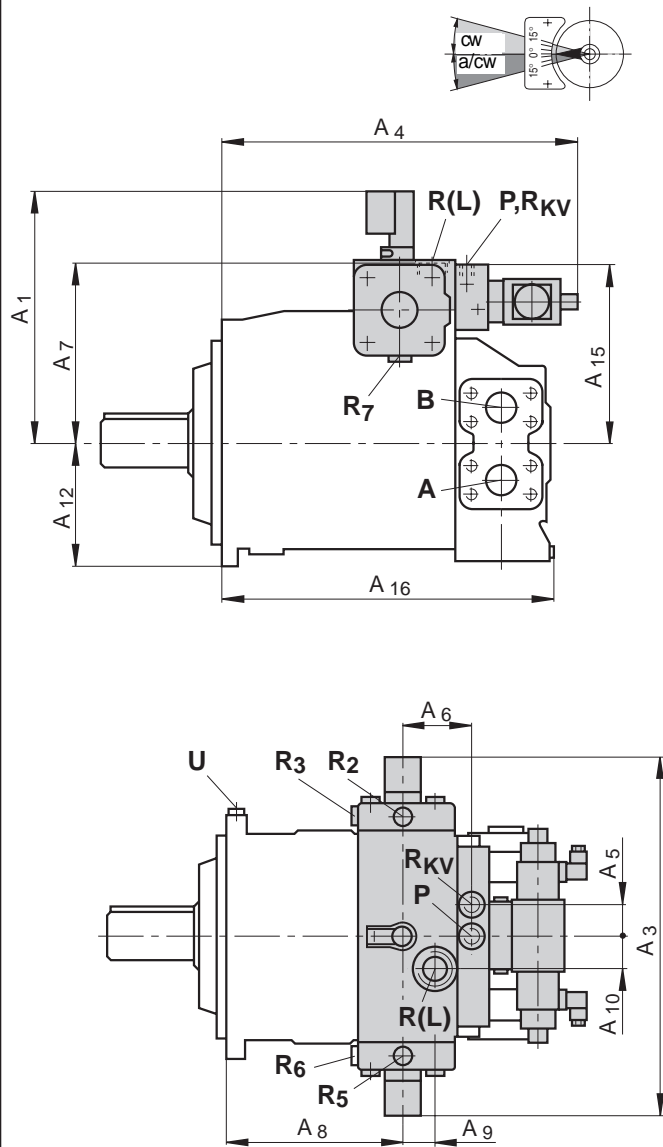
A4VSH - semi-closed circuit - RE 92110

A4VSG - closed circuit - RE 92100

Direction of flow

Swivel range ¹⁾ / solenoid operation	Rotation	a/cw
cw/b	B to A	A to B
a/cw/a	A to B	B to A

¹⁾ cf: swivel angle indicator



Unit dimensions

Ports

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₂	A ₁₃	A ₁₅	A ₁₆	R(L)	P; R _{kv}
500	392	190	555	562	50	109	280	279	50	50	225	520	274	510	M48x2	M27x2

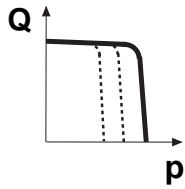
Control devices HM, HS and EO Variable displacement pump A4VS, series 1, 2 and 3

Before finalizing your design, please request a certified drawing.
Subject to revision.

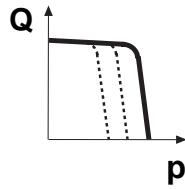
A4VS Control devices

RE 92060

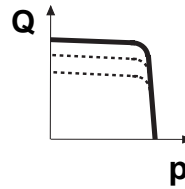
Pressure controller DR



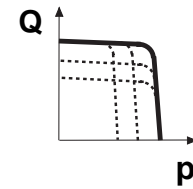
Pressure controller for parallel operation DP



Flow controller FR

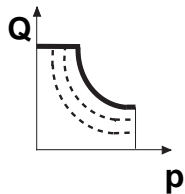


Pressure and flow controller DFR

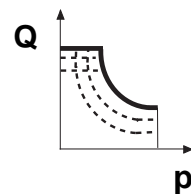


RE 92064

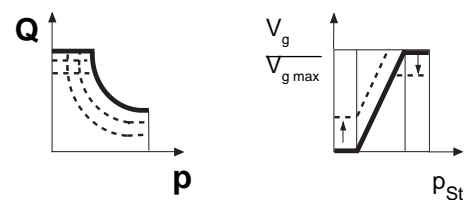
Power controller with hyperbolic curve LR2



Power controller with remote control power characteristic LR3

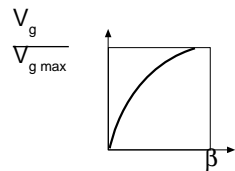


Hydraulic control pilot pressure-dependent LR2N



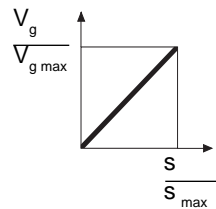
RE 92068

Hydraulic control stroke-dependent HW

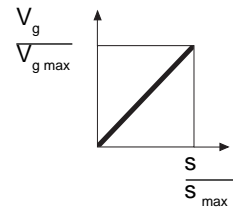


RE 92072

Manual control MA



Electric motor control EM

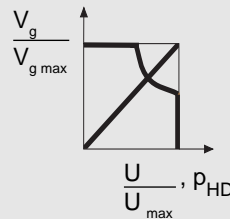


RE 92076

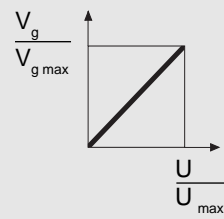
Hydraulic flow control quantity-dependent HM 1/2

Application: – 2 point control
– Basic device for servo or proportional control

Hydraulic flow control HS / HSP

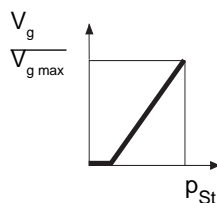


Hydraulic flow control EO1/2



RE 92080

Hydraulic control, pilot pressure-dependent HD



RE 92055

Speed regulation with secondary control DS1

